WinPilot

USER'S GUIDE

Version 6.09

www.winpilot.com
info@winpilot.com

Table of Contents

WINPILOT SOFTWARE LICENSE AGREEMENT 4

1 INSTALLATION 5

1.1 SETTING UP YOUR GPS DEVICE 5
1.2 INSTALLING WINPILOT SOFTWARE 5
1.3 INSTALLING AVIATION DATABASE FILE 6
1.4 INSTALLING COLOR TERRAIN MAP FOR YOUR REGION 6
1.5 INSTALLING ADDITIONAL TURNPOINT FILE 6
1.6 INSTALLING ADDITIONAL AIRSPACE FILE 6
1.7 INSTALLING POLAR FILE FOR YOUR GLIDER 7
1.8 INSTALLING THERMAL DATABASE FOR YOUR REGION 7
1.9 INSTALLATION THROUGH WINPILOT XP 7
1.10 SELECTING WINPILOT LICENSE TYPE 7
1.11 SETTING SERIAL PORT FOR NAVMAN, EMTAC, AND OTHER BLUETOOH GPS SOURCES THAT PLUG DIRECTLY INTO THE POCKET PC DEVICE. 9
1.12 SELECTING LANGUAGE 10
1.13 SUPPORT FOR VGA RESOLUTION (HP IPAQ 4700 AND SIMILAR). 10

2 INTRODUCTION 11

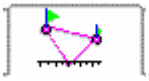
2.1 TOUCH-SCREEN USER INTERFACE 11
2.2 FRONT BUTTONS 11

3 MAP PAGE 13

3.1 MENU PAGE 14
3.2 NAVBOXES 15

4 THE BIG THREE 16

4.1 WAYPOINT BROWSER 16
4.1.1 Waypoint Browser – Creating User Defined Waypoints 18

4.2 FLIGHT PLAN EDITOR  22
4.2.1 How to insert a waypoint into the task. 23
4.2.2 Drag and Drop Task Editing 24
4.2.3 TASK page 27
4.2.4 Importing Tasks and Waypoints from SeeYou and StrePla 28

4.3 DETAILS VIEWER 28

5 FLYING A TASK 31

6 THE 'CHEVRONS' SCREEN (MCCREADY PAGE) 33

7 FINAL GLIDE OVER TERRAIN 37

8 TOUCH PAGE 39

9 USING GO TO 40

10 SWITCHING CONFIGURATIONS USING PROFILES 40

11 DATA SYNCHRONIZATION FROM DESKTOP PC TO POCKET PC 41

12 AIRSPACE 43

12.1 AIRSPACE FROM WINPILOT DATABASE (*.WA1) 43
12.2 USER'S AIRSPACE 44

13 THERMAL FINDER 45

13.1 CREATING THERMAL DATABASE 45
13.2 USING THERMAL DATABASE IN FLIGHT 49

14 AVAILABLE MENU PAGES 51

14.1 ON – OFF MENU FUNCTIONS DESIGNED TO BE ASSIGNED TO FRONT BUTTONS OF A POCKET PC 52
14.2 SETTINGS 53
14.3 SETTINGS2 54
14.4 FINAL GLIDE 56
14.5 RULES PAGE 56
14.6 LABELS PAGE 59
14.7 FONTS 60
14.8 NAV BOXES 60
14.9 UNITS 62
14.10 FILES 63
14.11 POLAR 64
14.12 POSITION 64
14.13 ON-LINE CONTEST (OLC) 65
14.14 TRACE 65
14.15 SENDING ELECTRONIC DECLARATION TO YOUR LOGGER 67
14.16 TRANSFER OF IGC FLIGHT LOGS 68
14.17 WINPILOT AS A FLIGHT RECORDER 69
14.18 3D WIND 69
14.19 LANGUAGE (GERMAN, FRENCH, ITALIAN, AND MORE) 70
14.20 SYMBOLS 71
14.21 MAP 71
14.22 LX1600 72
14.23 DISPLAY REQUIRED L/D ON THE MAP INSTEAD OF ARRIVAL LABELS WITH ALTITUDE. 76
14.24 GOTO PAGE. 76
14.25 RUN 76

15 CLIMB MAXIMIZER (WINPILOT PRO ONLY) 78

16 TEAM FLYING 79

17 RISK MANAGEMENT 80

17.1 SELECTING WORKING ALTITUDE BAND 80
17.2 SELECTING MCCREADY VALUE 81
17.3 SELECTING TASK LENGTH 81

18 SAMPLE FLIGHTS 81

18.1 BADGE OR RECORD FLIGHT 81
18.2 COMPETITION FLIGHT: USING DOUBLE-CYLINDER START GATE 81
18.3 COMPETITION FLIGHT – ASSIGNED TASK 82
18.4 COMPETITION FLIGHT – PILOT SELECTED TASK 82
18.5 COMPETITION FLIGHT – ASSIGNED AREA TASK 82
18.6 LOCAL FLIGHT 84

APPENDIX A FORMAT OF WINPILOT FILES 85

A.1. POLAR FILE 85
A.2. USER WAYPOINT FILE 85
A.3. USER AIRSPACE FILE 86

WinPilot Software License Agreement

Do not install or use the software until you have read and accepted all of the license terms. Permission to use the software is conditional upon you agreeing to the license terms. Installation or use of the software by you will be deemed to be acceptance of the license terms. Acceptance will bind you to the license terms in a legally enforceable contract with Sierra SkyWare, Inc.

By starting the WinPilot Software ("The Software"), **YOU CERTIFY THAT YOU AGREE** to the requirements of this document. You should not use The Software until you have read and accepted this License Agreement.

License The WinPilot program is licensed, not sold to you for use solely under the terms of this License Agreement. This license permits you to use the software on a single hardware device at any one time. Installing the Software on more than one machine, or on a network server is a violation of this License Agreement.

1. Copying and Alternation

   You may not copy, alter, modify, adapt, translate, or create derivative works based upon the WinPilot software or Documentation, or any part of them.

2. Transfer

   You may transfer all of your rights in the WinPilot software under this license to a third party **only** if (a) you transfer both the documentation and software to the third party, (b) you show the third party this License Agreement and the third party agrees to abide by its terms and conditions, and (c) you transfer all the current and past versions of the WinPilot Software and documentation to the third party. By accepting the WinPilot software, the third party consents to be legally bound by all terms and conditions of this License Agreement. You may not sublicense, rent, lease, distribute, transmit, make available on a network, or transfer the WinPilot Software or Documentation to a third party except as provided in this paragraph.

3. Reverse Engineering

   You may not de-compile, reverse engineer, disassemble, or otherwise reduce the Software Programs to a human readable form.

4. Limitation of Liability

   Sierra SkyWare, Inc, a Nevada corporation, or any of its dealers will in no event be liable for indirect, special, consequential, or incidental damages resulting from any defect, error, or omission in the Software or Documentation, or from any other events, including, but not limited to, flying into restricted airspace, landing out, colliding with terrain or another aircraft.

   You assume all responsibility arising from the use of the Software and/or Documentation. Sierra SkyWare liability for damages to you or a third party will in no event exceed the total amount paid by you to obtain the rights to use the WinPilot product. **THE SOFTWARE IS FURNISHED AS IS, WITHOUT WARRANTY OF MERCHANTABILITY OR FOR ANY PARTICULAR PURPOSE.**

   WinPilot is not an FAA approved navigational aid. The pilot is always responsible for carrying on board of his aircraft a FAA approved set of navigational aids, according to FAA regulations.

5. Termination

   This license is effective until terminated. You may terminate the license at any time by informing Sierra SkyWare, Inc. in writing of your intention to do so, and destroying the Software and Documentation so that they are unusable.

6. Cancellation

   This license shall terminate immediately without any notice from Sierra SkyWare, Inc., if you fail to comply with any of its terms.

7. Action Following Termination or Cancellation

   Upon termination or cancellation of this license in accordance with paragraphs 6 or 7 above, you agree to destroy the Software and the Documentation so that they are no longer usable, and to make no further use of either the Software or the Documentation.

8. Other

   a) This License Agreement shall be governed by and construed in accordance with the laws of the United States of America, and State of Nevada.

   Any disputes arising under this License Agreement shall be referred to the SOLE AND EXCLUSIVE JURISDICTION OF THE DOUGLAS COUNTY DISTRICT COURT IN MINDEN, NEVADA, USA.

Sierra SkyWare, Inc. P. O. Box 2799, Minden, NV 89423, USA

1 Installation

If you have not yet installed Windows CE Services or ActiveSync on your host computer, you must do so before you can install the WinPilot software. (Refer to the documentation that came with your Pocket PC for instructions.) When ActiveSync is installed, you can connect your Pocket PC to the host computer using the cable provided with your Pocket PC. The computers will establish the connection automatically when the cable is inserted. Consult your Pocket PC documentation for details.

Before attempting to install WinPilot, please read carefully all manuals that came with your Pocket PC system. Install Active Sync CD on your PC. Browse the contents of your device using the "Explore" Active Sync button. When you are comfortable in the PC/Pocket PC environment, you can proceed with WinPilot installation. All installation files can be found on www.winpilot.com – Newest Version page. After the installation is complete, you should be able to see two WinPilot shortcuts in your Start menu, similar to those on the picture on the right.

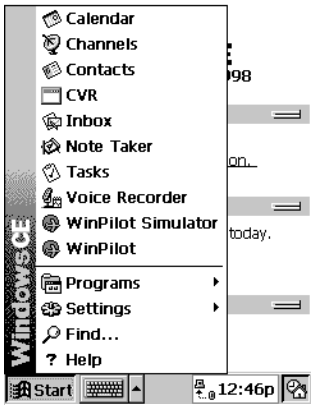


Figure 1-1

If for any reason your device locks up, or fails to power up, press the RESET button located in a small hole on the back of the device (or on the bottom in case of the iPAQ).

1.1 Setting up your GPS device

Set the output of your GPS device to NMEA 183 2.0 or 1.5 at 4800 baud, and enable the following sentences: GPRMC and GPGGA. If you are using a Volkslogger, set NMEA output in the CFG2 menu to:
`'minus-minus-X-X-minus-minus-minus-minus'`

If you have difficulties connecting GPS to your Pocket PC, you might try the WinPilotTty.exe application available on our web site (FAQ page). It shows the NMEA data that is reaching the Pocket PC serial port.

1.2 Installing WinPilot software

1. Go to www.winpilot.com web site and download a version proper for your model of Pocket PC to your desktop computer. You may need to **right-mouse click** on the link, select "Save Target As...", and specify a directory on your drive that you can easily find after the download is complete.

2. Start ActiveSync and connect to your Pocket PC using the USB/Serial cradle that came with your Pocket PC.

3. Double-click on WinPilot Installer downloaded in Step 1 above, click through the Install Wizard, all the files are installed automatically in the right places on your Pocket PC.

4. After the installation is complete, you should be able to see two WinPilot shortcuts in your Start menu. If installation is performed on a Pocket PC, the device should be Reset using the RESET button, for the big WinPilot and WinPilot Simulator shortcuts to appear on the main screen of the device (also called the 'Today' screen). Note: these shortcuts can be disabled via Start.Settings.Today.

1.3 Installing Aviation Database file

Go to www.winpilot.com and download Airport/Airspace data file to your desktop PC. Starting with Version 5.05 the Airport/Airspace data file is automatically installed. The file can be selected in WinPilot via Menu.Files page. Connect to your ipaq with active sync and the double click the WP_USA_Install_40xx. Extension for this file is *.wa1

1.4 Installing Color Terrain Map for your region

Color maps of manyl countries of the World are available on 'Color Maps' page on www.winpilot.com.
Installation steps:
1. Download a map file (extension *.wp3) from our web site to your desktop PC (if the extension is *.zip, you will need to unzip it).
2. Using Active Sync, copy it to \My Documents directory on your Pocket PC.
3. In WinPilot Simulator, go to Menu.Files.Terrain Map, and select the file.

1.5 Installing additional Turnpoint file

In addition to airports from database file (*.wa1), users can also select additional waypoint file in the *.dat format (see Appendix). This is especially useful at soaring contests, where each turnpoint coordinate is given by the organizers, and can be different from coordinates in WinPilot database.
A good selection of additional turnpoints can be found on:. http://soaring.gahsys.com/TP/

1.6 Installing additional Airspace file

WinPilot 3.5 uses airspace data from WA1 files that are available on www.winpilot.com. If for any reason that airspace is not sufficient, additional airspace data can be added by the user. The format of this additional airspace file is described in the Appendix (OpenAir). Some additional airspace files are available on our web site under

the 'Airspace' heading. User Airspace file must have extension *.txt, and has to be placed in \My Documents folder on your iPAQ.

1.7 Installing Polar File for your glider

By default the WinPilot setup program installs a polar file for a glider similar to LS-4. A large collection of different Polar files is available on WinPilot web site (select Polars page). Special thanks to Carl Herold who prepared all files available there. He can be reached at cdherold@charter.net for more details. Polar file can be selected in WinPilot via Menu.Polar page.

Please note that in many cases the supplied Polar file might be much too optimistic for your glider. To avoid undershooting your Final Glides, you should start your flights with polar degraded by applying Bug Factor (settable on Menu.Settings.%Clean). Only once you become confident that your glider can perform at the level that the Polar file assumes it does, should you decrease the bug factor. You can also create your own polar for your glider, polar file format is described in the Appendix.

1.8 Installing Thermal Database for your region

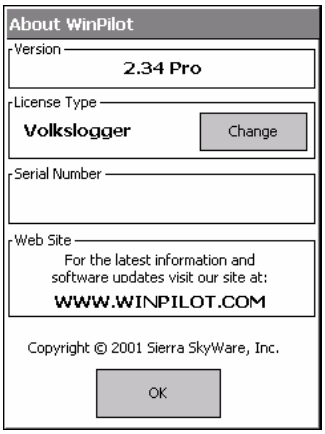
Thermal database containing ground sources of thermals can be build using a process described in chapter 'Creating Thermal Database'. The file has extension *.wt1, and needs to be placed on the Pocket PC in directory 'My Documents'. It can then be selected into WinPilot using Menu.Files.

1.9 Installation through WinPilot XP

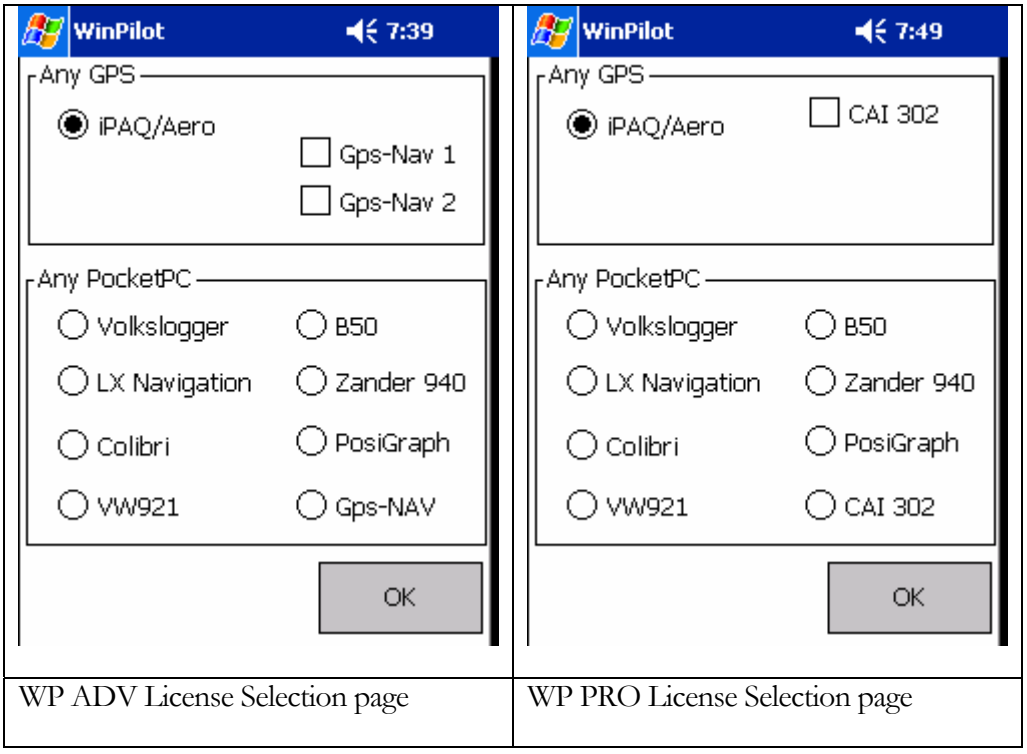
Starting with version 4.10, the Desktop version of WinPilot XP is capable of installing files on the Pocket PC. Instead of copying all the files manually, the user can set up his desktop version of WinPilot, and then press the Synchronize button to have all selected files transferred automatically to the Pocket PC.

1.10 Selecting WinPilot License Type

We believe that WinPilot has the most flexible licensing in the industry. A license can be obtained either for unlimited number of PocketPCs and a single logger, or for unlimited number of GPS devices/loggers and a single PocketPC, depending on user's preference. A per-iPAQ/AERO license makes it easy to take an iPAQ or AERO running WinPilot from one gps/logger to another, or from one glider to another, which should be especially attractive for people who frequently change gliders and/or flight computers (as in a club situation). To select the correct license start the Simulator, and go into Menu.About.License which brings up the following page:



To change License Type, press the Change button, which brings up the following page:



WP ADV License Selection page	WP PRO License Selection page

If your WinPilot PRO is used with Cambridge 302, please select checkbox '302' in the upper right corner, regardless of selected License Type.
In case of WP Advanced, and only is CAI GPS-NAV logger is used, you need to select checkbox 'GPS-NAV1' in the upper right corner of the page. If your GPS-NAV doesn't connect using this setting, then the GPS-NAV1 box should be unchecked, and GPS-NAV2 box should be checked instead. These boxes should be used only for Cambridge GPS-NAV, for all other GPS devices both boxes should be unchecked.
Select the license type proper for your system. For example, if your license is based on iPAQ's serial number, select 'iPAQ/AERO and click OK. The About page now looks like this:

Note that now a serial number of your iPAQ /AERO is shown on the About page, along a button labelled Password that allows you to enter a password that you have received from us. After entering the proper password, you should see message 'Password OK'.

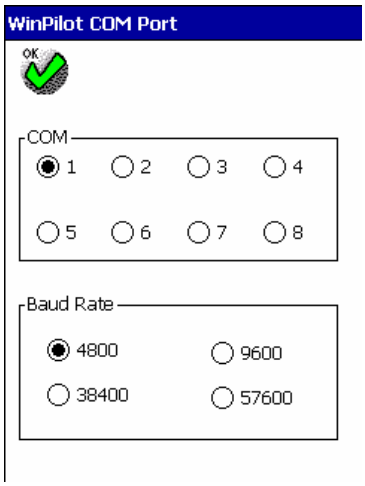
If your license is not based on the serial number of your Compaq unit, but on the serial number of your logger, then you will need to set the logger to output the custom WinPilot sentence that contains logger's serial number. Here is a list of sentences that various loggers implement to be compatible with WinPilot: Colibri: PFSRA, LX5000: LXWP, PosiGraph: GPWIN, Zander: PZAN1, Volkslogger: PGCS, B50: PBSER. You are only promted for the password when you are connected to the logger. You cannot enter the password in simulator mode as you could for PDA based licenses.

1.11 Setting Serial Port for NavMan, EMTAC, and other Bluetooh GPS sources that plug directly into the Pocket PC device.

WinPilot by default expects serial data to come on Com1:. Devices that don't connect over serial cable that plugs in at the bottom of the iPAQ usually send NMEA data stream on serial port other than Com 1:. To accommodate these devices serial port in WinPilot needs to be changed. Here are the steps:

1. Figure out on which serial port does your GPS device sends in NMEA serial data. If in doubt, consult your device's User Manual, or run a test application that came with your device, or contact the manufacturer of the device for advice. As a last resort, you can try in WinPilot all serial ports between Com2: and Com8:.

2. Start WinPilot Simulator, and see if you have a button named 'Com Port' available on Menu page. If that button is not available, enable it using Menu.Edit.



3. Press Menu.ComPort, and set ComPort to one that your device is sending data on. You can also adjust the baud rate (Some devices use 57600 baud).

4. Exit Simulator, start WinPilot in GPS mode, it should show your position.

5. Note: Setting the serial port in WinPilot Simulator also sets port used by the serial port debug application WinPilottty.exe available on our website (on FAQ page).

1.12 Selecting Language

WinPilot 5.0 allows selecting different languages (English, German, French. Italian, etc) for NavBoxes, Menus, etc. Click here for more details.

1.13 Support for VGA resolution (HP iPAQ 4700 and similar).

Note: iPAQ 4700 Users who installed any version of WinPilot older than 6.01 on their device should delete file: "\My Documents\WP_SETTINGS.xml" to assure proper initialization of fonts.

2 Introduction

WinPilot can be started in two distinct modes: Simulator (use WinPilot Simulator shortcut), and GPS mode (use WinPilot shortcut). Using the Simulator is the easiest and quickest way to learn the program.

2.1 Touch-screen User Interface

Depending on where you touch the screen, you get the following responses:

1. Touching the '`Menu`' rectangle brings up the Main Menu.

2. Pressing the rocker switch below the screen changes the zoom level of the map. (zoom can also be changed by touching the upper right corner, which activates the zoom table).

3. Touching the North-arrow symbol in the upper left corner of the map changes orientation of the map between North-Up, Track-Up, and Goal-Up.

4. Touching the symbol of a glider activates SIM circle (Simulator Mode Only), which allows changing the speed and direction of the simulated glider.

5. Clicking on a waypoint label activates pop-up window with details describing the item. It is possible to quickly add this point to the active flight plan by selecting Action.Add To Task, or switching to the second tab . Note: It is possible to switch to double-click activation – see Menu.Labels.

6. Clicking on a label describing an airspace segment brings up a pop-up window with the full name of the airspace, floor and ceiling information, and distance to the closest point.

7. Touching the screen where none of the above-described elements are invokes either the PAN or GoTo mode (depending on the letter showed on a button in the upper left corner P=Pan, G=GoTo) . Pan mode allows moving map in a desired direction. Just keep your finger on the screen while moving it in the direction of the desired map pan. Tap on RESTORE to bring the map back to the original position.
   If GoTo mode is selected, a list of waypoint in the desired direction will be shown.

   Note: The pilot can **pre-select** which elements on the map should be sensitive to a touch by using the **Touch** page.

2.2 Front Buttons

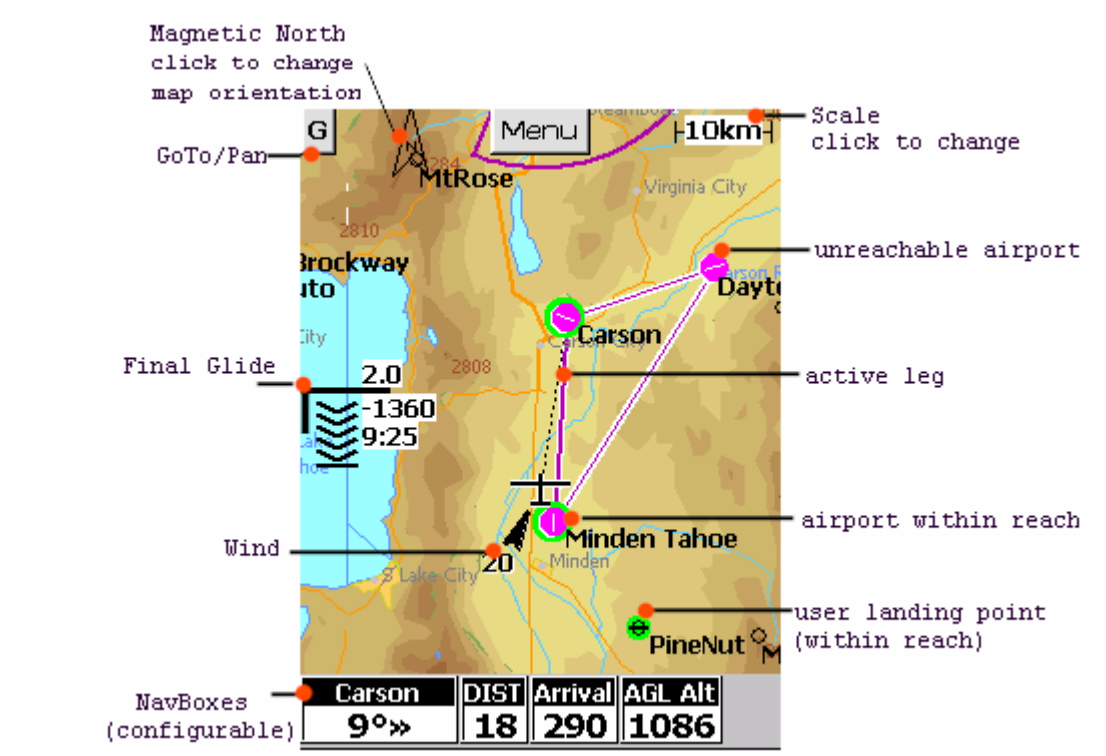
The four front buttons below screen can be programmed to invoke any WinPilot menu command . When the map is not shown, these buttons bring the map page back to the foreground.

To assign a command to any of the front buttons, go to Menu.Edit, press one of the small rectangles at the bottom of the screen, and select the command you want to assign to that button from the drop-down list of commands.

Front buttons also can have a different use when flying Assigned Area Task. They can be used to move Mobile Turnpoints inside an Area. Pressing the Rocker switch in the middle switches operation of that switch from Zoom-In and Zoom-Out to moving Mobile Turnpoints. Pressing Up and Down brings Mobile Waypoint closer or further away from the root of an Area, and pressing the left or right rocker key moves the Mobile Turnpoint clockwise or counter clockwise within an Area see Flying AAT.

3 Map Page

WinPilot's map can be oriented either North-Up, Track-Up, or Goal-Up. Map orientation can be changed by touching the Magnetic North arrow (see below). Zoom level can be changed from 1km screen width to 2000 km screen width either by pressing the front rocker switch up or down, or by touching scale of the map.
All airspace and waypoint labels are touch sensitive (information at your fingertips). Touching a label invokes Details window for a given waypoint. It is possible to make the labels sensitive to a single touch, or double-touch (Menu.Labels). Clicking on 'Menu' allows selecting other pages of the program.
Below is a description of the different areas of the map screen:



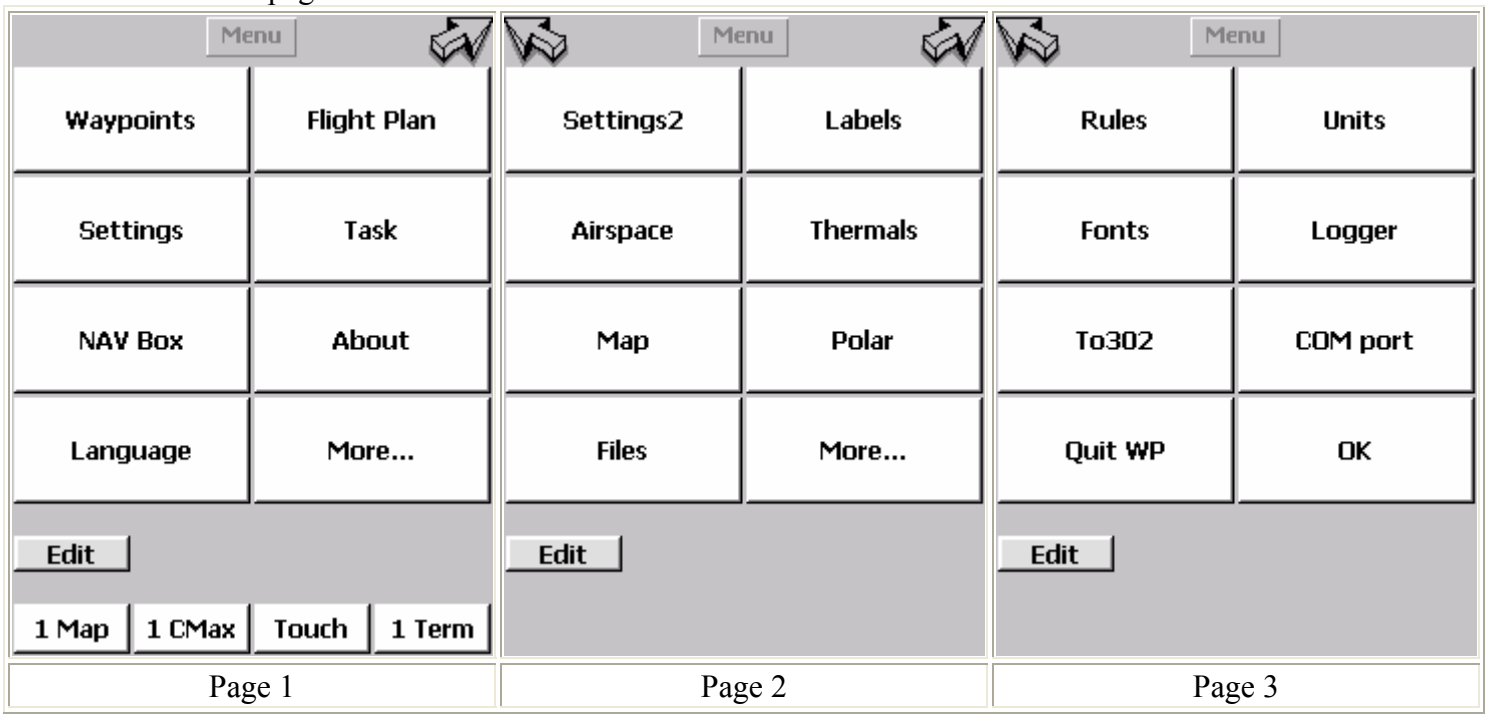
GoTo/Pan – If the button shows '**G**', the map is in GoTo mode. Touching the map and moving the finger in some direction will invoke Waypoint Browser page showing waypoints in that direction. When the text on a circle reads 'Near', only waypoints within 75km will be shown, if the text reads 'All', all waypoints in a given direction will be shown. If the button shows '**P**', then the map is in Pan mode. Touching the screen and dragging will move the map in the desired direction.
Final Glide – Example above shows the following info: McCready setting is 2.0, final glide around all turnpoints indicates that the glider is 1360 below the glide slope, Estimated Arrival Time at the finish is 9:25, the Chevrons indicate that the glider is more than 20% below the glide slope (each Chevron indicates 5% above or below glide slope), and the Push/Pull bar (available only in WP PRO) indicates that the pilot should speed up.
NavBoxes – can be configured via Menu.NavBox page. In this example the following boxes are

visible: **Destination Arrow** indicates that to fly directly to Carson the pilot should turn right 9 degrees, **DIST** shows the distance to the next waypoint (Carson), **Arrival** shows at what altitude the next waypoint will be reached (290), and **AGL Alt** shows the current altitude above ground (1086).
Scale – shows 10km screen width. To change it, press the front rocker switch (up or down), or touch the scale.
Airports within reach from the current position and altitude are shown with a green background (Carson, Minden above). This can be changed via Menu.Labels to show a green name label instead.
Active Leg – when a task is set, the active leg is shown using a thick magenta line. Other legs are shown using a thin magenta line.
User Landing Point – In addition to airports from WinPilot database (*.wa1), also user airports/landing places (from a *.dat file) can be shown on the map. Here the Pinenut airport is shown to be within reach (because it has green background).

3.1 Menu Page

When '**Menu**' button is pressed on the main map screen, the first Menu page appears. By pressing 'More…', it is possible to switch to other Menu pages. **All Menu pages are fully customisable - any function can be assigned to any button, using any text in any language**. This can be done by pressing the 'Edit' button, and then pressing a button to be assigned. A pull-down menu appears, from which it is possible to select a function and text for the given button. A function can be unassigned from a button by selecting the first option from the pull-down menu (empty space). The small buttons at the bottom of the first menu page have a special meaning – they represent the four hardware buttons found on a Pocket PC device below the display. By invoking Menu.Edit, any menu function can be assigned to any of these buttons. In the example below, 'Mark Position' has been assigned to the first hardware button, and 'Waypoints' to the fourth.

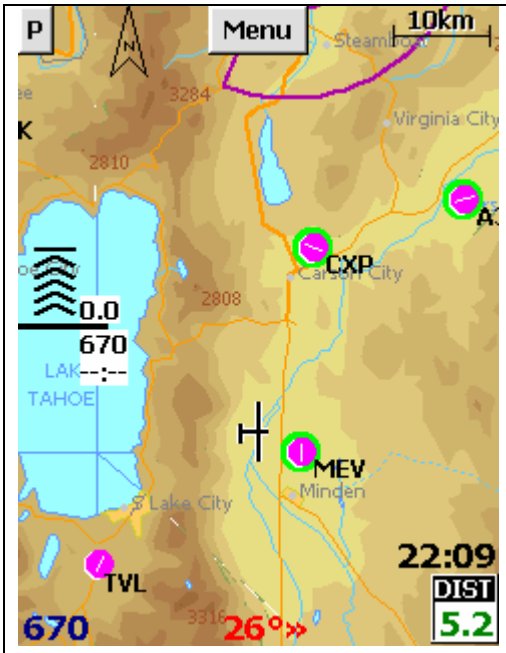
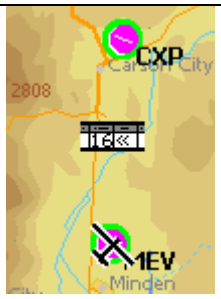
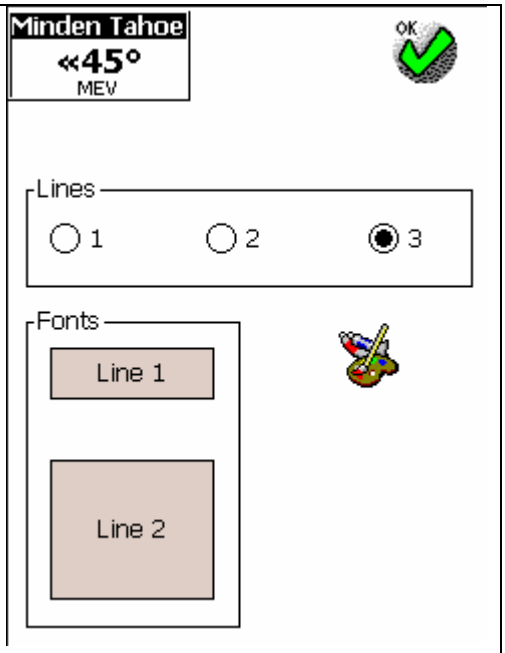
Default Menu pages:



Page 1	Page 2	Page 3

3.2 Navboxes

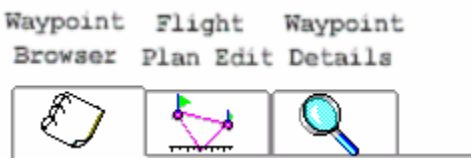
Navboxes are small windows on the screen that show various information that can be specified by the user via **Menu.Navbox** page.
Each Navbox can be configured separately. It is possible to specify how many lines of information should a given box show. When '**1 line**' is selected, only the Navbox value is drawn on a transparent map background. This makes it possible to have more Navboxes on the screen than before without taking space away from the map.

		
Different types of Navboxes on the screen – 1, 2, and 3 lines.	When a Navbox is touched, Navbox edit symbol appears on the map. When touched, it brings up Navbox Edit window.	Navbox Edit window. Here it is possible to specify how many lines should a given Navbox have, what fonts should be used for line 1 and 2, and what colour should the Navbox have.

More information about Navboxes can be found here.

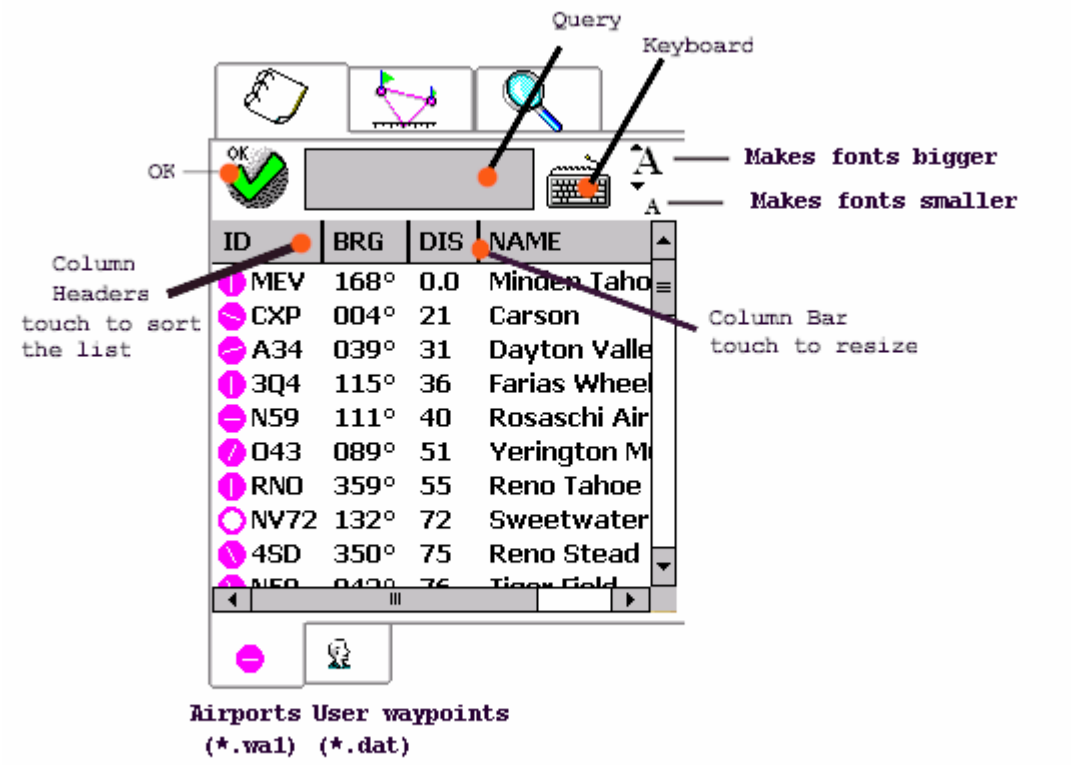
4 The Big Three

The main navigation and information access capabilities of WinPilot have been grouped on a tab that contains three functions: Waypoint Browser, Flight Plan Editor, and Waypoint Details view:



Waypoint Browser can invoked via 'Menu.Waypoints' (or by using GoTo on the map), Flight Plan Editor via 'Menu.Flight Plan', and Details page can be invoked by either selecting a waypoint on one of the first two pages and switching to the third page, or by touching a label associated with a given waypoint on the map.
The basic usage scenario goes like this:
Waypoint browser is used to narrow down the list of interesting waypoints. Each of them can be examined more closely by switching to Details page .When a desired waypoint is found, it can be entered into a task using Tap-and-hold (see below), or by switching to the Flight Plan Page , and selecting Wpt.Insert.

4.1 Waypoint Browser



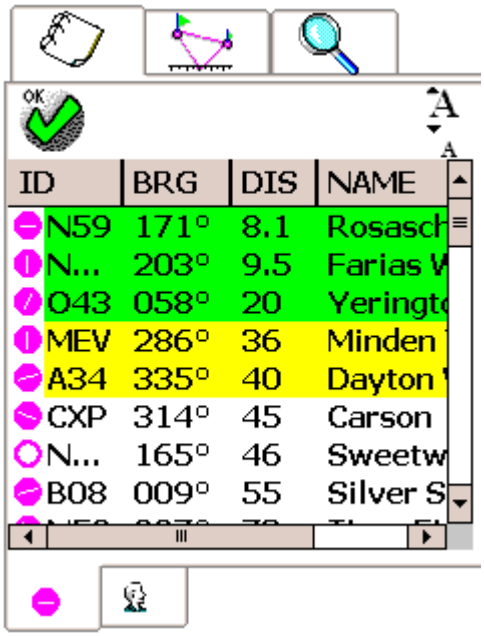
Waypoint Browser is used to narrow down the list waypoints that are potential candidates to be entered into the task. The Browser is divided into 2 main categories: Airports (from *.wa1 file), and User Waypoints (from *.dat file). A tab at the bottom of the screen can be used to select which category is currently visible. To see the User Waypoints tab, a user waypoint file has to be selected on Menu.Files. When the Browser page is opened, waypoints are sorted by distance from the current position, with the closest waypoints being at the top of the list. This sort order can easily be changed by touching header of a column. For example, to sort the list by name, instead of sorting by distance, touch the Name column header. The list of waypoints will be then sorted in ascending order (from A to Z). Touching the column header for the second time reverses the sort order (from Z to A). The same applies to the other columns. Touching the BRG column sorts the list by bearing from the current position. This could be useful when looking for waypoints located only in a specific direction.

The width of columns can be adjusted by dragging the black vertical bar between columns (see picture above) left or right. Size of fonts used in the Browser can be changed by pressing the big A (makes fonts bigger), or small A (makes fonts smaller). The font face can be changed via Menu.Fonts.Browser.
A keyboard can be used to enter a query string. For example, to display all airports staring with 'MI' type these letters using keyboard into the Query field.

Waypoint Browser uses **Tap-And-Hold** semantics. When the user taps on a waypoint name (Minden Tahoe in our example) and holds his finger for about two seconds, a Task Insert dialog appears (see below):

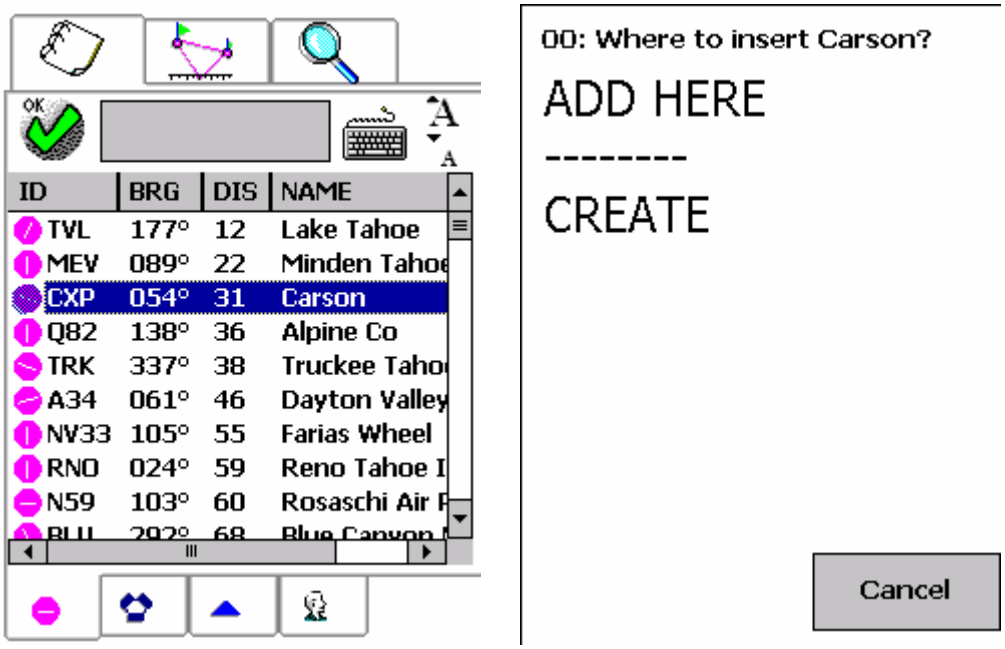
When this dialog appears, touch the position in Task when the new waypoint should inserted. In this example, to insert 'Minden' at the beginning of task, the name 'Carson' should be touched, or to append it at the end, '**ADD HERE**' should be touched. In flight, due to a possible turbulence, an easier way to add the selected waypoint to the task might be to switch to the Flight Plan page, and select **WPT.Insert**.

WayPoint Browser (Version 6.06) Airports within reach at the current McCready have green background. Airports that can be reached with a lower McCready setting are shown in yellow.

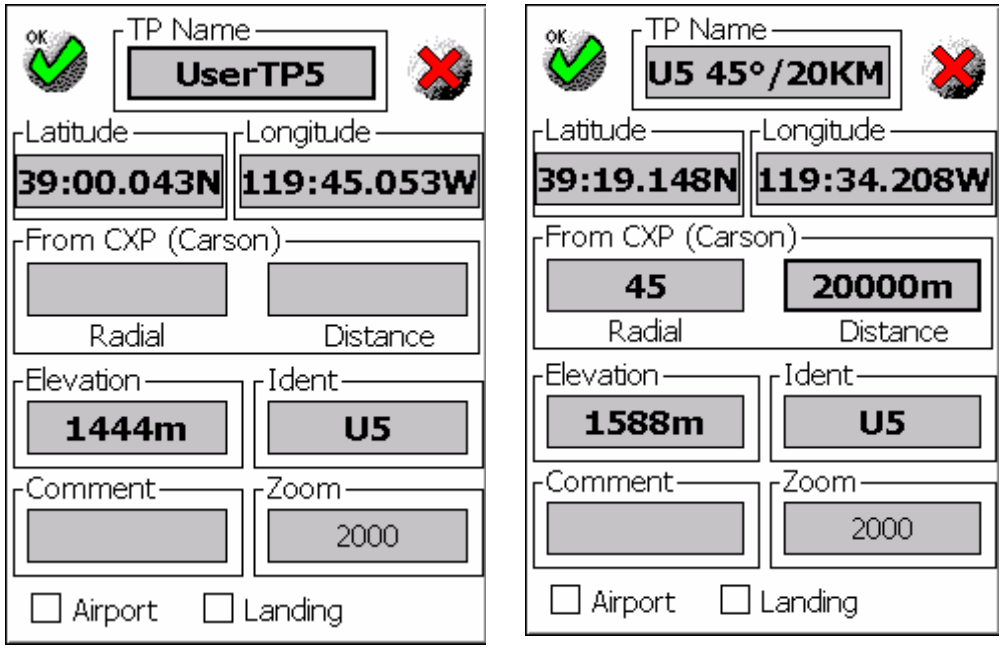


In addition to navigating to airports, intersection, VORs, etc. from the Database, WinPilot can also navigate to waypoints created by the user. There are two basic categories of user waypoints: absolute, which are created by entering Latitude and Longitude, and relative, which are created by entering bearing and distance from another waypoint. Both categories are created from Waypoint Browser page from the Tap-And-Hold menu.

To create a waypoint relative to waypoint A, touch-and-hold waypoint A on Waypoint Browser page to see the '**Create'** Menu. In the example below, Airport CXP (Carson) has been selected. If the user keeps his finger on the name 'Carson' for about 2 seconds, a menu shown below right appears.



Selecting '**Create'** invokes waypoint editor (see below left):



WinPilot fills the Latitude and Longitude with the current position of the aircraft. The **Elevation** field is initially set by WinPilot to approximate ground level at the current position (assuming that terrain map for the current position has been selected on Menu.Files). If terrain map is not available, WinPilot sets **Elevation** to 5000m.

The **From** box is set to the waypoint that has been used to invoke the editor (CXP Carson in our example). Now, the user can create a relative waypoint by entering **Radial** and **Distance** from the selected waypoint. In our example, lets create a waypoint that will be located 20km from CXP on radial 45°. The user touches **Radial** to enter 45 (radial), and then he touches **Distance** to enter 20KM (distance). The result can be seen on the picture above right. WinPilot updated **Latitude** and **Longitude** of the new point, and it changed **Elevation** to Ground Level at the new location. Also, the name of the new waypoint has been modified to show the ID of the base waypoint, and radial and distance from it.

This page always shows distance in meters (in our example above 20KM = 20000m). However, the distance can be entered in any units. For example, the user could have typed 20SM or 20S (20 statute miles), 20NM or 20N (20 nautical miles), 5000FT or 5000F (5000 feet). WinPilot would automatically convert these numbers to meters. If the user doesn't type in any units only a number (for example 10000), then this number is assumed to be meters.

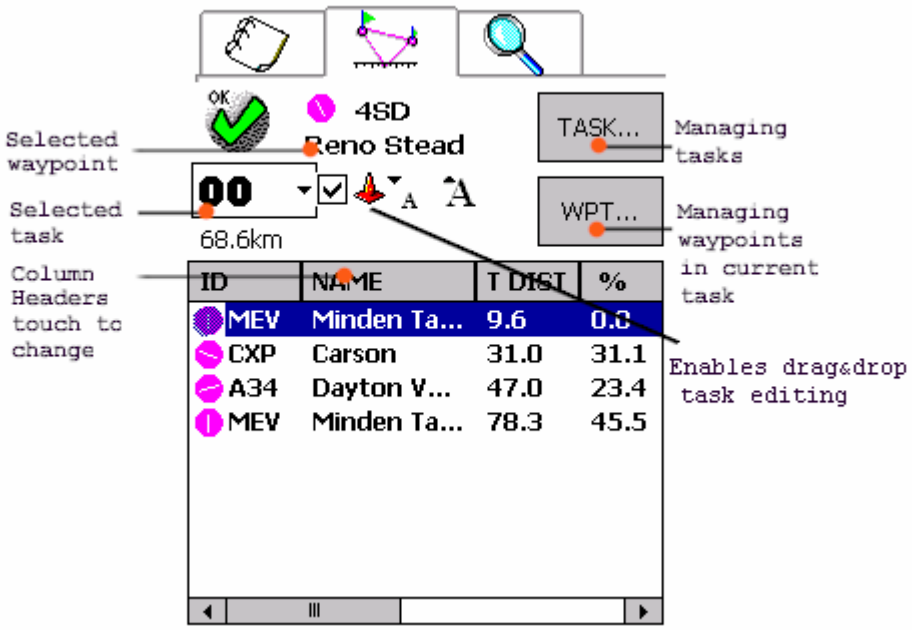
To create a new waypoint by entering its position, the user needs to type in the coordinates. The following Latitude and Longitude formats are supported:

Format	Data	Example
DD:MM:SS	degrees:minutes:seconds	39:12:59N
DD:MM.m	degrees:minutes.decimal minutes	39:12.9S
DD:MM.mm	degrees:minutes.decimal minutes	117:35.89W
DD:MM.mmm	degrees:minutes.decimal minutes	189:59:990E

Comment is a filed that can contain any text shorter than 12 letters.
Zoom controls at what Zoom level should this waypoint be shown on the map. This is used to prevent map cluttering at higher zoom levels. For example, when multiple names overlap each other at a higher zoom level, the user can elect to display only the most important names at that zoom level.

Airport and **Landing** checkboxes are used if the user wants WinPilot to compute engine-off glide to that waypoint. Airport has a little thicker line when displayed on the map.

4.2 Flight Plan Editor



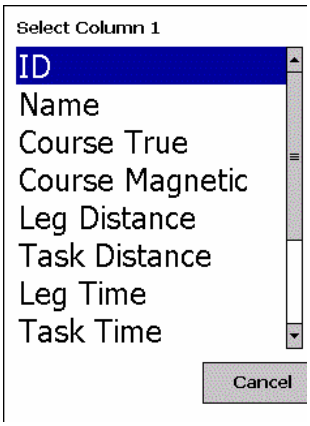
Flight Plan Editor page allows managing tasks and waypoints in the current task.
There are 24 possible tasks, but the one being flown is always task **00**. Any task can be copied to task **00**, and task **00** can be copied to any other task. Task **24** is used for drawing lines on the map for any purpose chosen by the owner.

In task **00**, WinPilot always navigates to the first waypoint on the list. Once that waypoint is reached, it is removed from the list, and WinPilot navigates to the next waypoint on the list. Any waypoint can be removed from the list by **WPT.Delete**.

In the example above the task length is 68.6 km (shown below '00'). This number does not include distance from current position of the glider to the first waypoint of the task. The task distance shown at the first leg is 9.6, which means that the glider is 9.6 km from the start of the task. The Task distance column of the last waypoint shows 78.3, which is a sum of task distance and the distance to the first waypoint.
If the task is a record or badge attempt flown on a triangular course, it might be useful to check the % column, to verify that each leg does not exceed the % of task distance specified by the FAI.

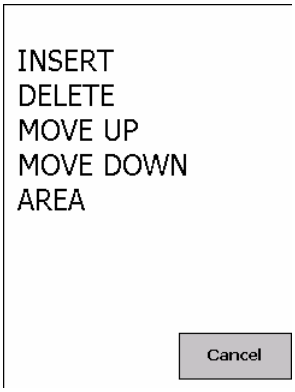
Most people create tasks in Simulator mode (including AAT and placing Mobile Turnpoints at the appropriate locations). After a task is created, it can be transferred (and declared) to a Volkslogger using the '**VL Dcl**' menu, or to a Cambridge 302 using the '**To 302**' menu. Note that only task 00 can be declared to a logger.

All columns are user-selectable. To make a given column show other type of data, touch its header to display the dialog on the right. The first column always contains waypoint ID. Other columns can contain any of the following: ID, Waypoint Name, True Course, Magnetic Course, Leg Distance, Task Distance, Leg Time, Task Time, Arrival Time (ETA), and **%** – percentage of the total task distance (useful for flying records and badges).

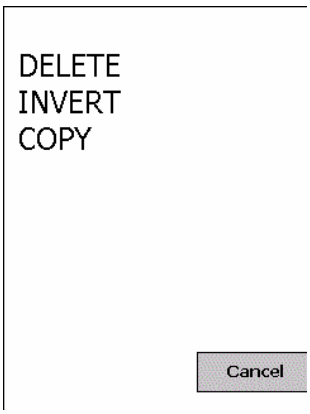


Button '**WPT…**' allows managing waypoints in the currently selected task. To select a waypoint, touch it on the screen. The picture on the right shows operations that can be performed on the selected waypoint.

<u>**Tap-And-Hold:**</u> The '**WPT…**' menu can also be invoked by touching a waypoint, and holding finger on it for about two seconds.
AREA is used in flying **A**ssigned **A**rea **T**asks, and allows defining a circular, or pie-shape area around a selected waypoint, along with a mobile turnpoint that can be moved on the map with a finger to place it at the position that gives arrival at the finish at the desired time.



To manage tasks, press the '**TASK…**' button.
'**Delete**' removes all waypoints from the currently selected task, '**Invert**' reverses them, and **Copy** allows copying the current task to another task location (between 0 and 24). When a 'GoTo' function has been used to suspend a task and fly to the GoTo destination, this menu will also contain a '**RESUME TASK**' option that can be used to resume the task.



4.2.1 How to insert a waypoint into the task.

There are several ways to insert a waypoint into the task:
<u>Method 1</u>. On the Waypoint Browser page , select a waypoint, and keep your finger on it for about 2

seconds (newer iPAQs will show a circle of rotating red dots during that time). After 2 seconds, a dialog will appear allowing inserting the selected waypoint into task at any location. This method is preferable on the ground.

Method 2. On the Waypoint Browser page , select a waypoint, and then switch to the Flight Plan page , and press **WPT.INSERT**. This method is preferable in flight.

Method 3. From the map page, tap (or double-tap) on a waypoints label to invoke waypoint's Details Page . Select **Action.Add To Task**, and touch the place in the task where the new waypoint should be inserted.

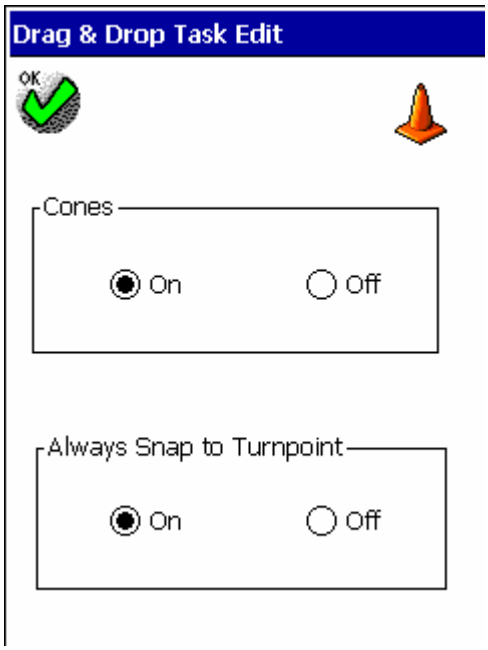
Method 4. From the GoTo dialog: put your finger on the map and extend it in the direction where your next waypoint might be located. Up comes the Browser page filled with waypoints in that direction. Select the waypoint you want, and use method 1 or 2 to insert it into the task.

Method 5. Select **Touch** page, choose if you want to add a user waypoint of airport from WinPilot's database, and press '**+Task**'. The next item touched on the map will be added to the task (the user has an option to specify at what position should that waypoint be added).

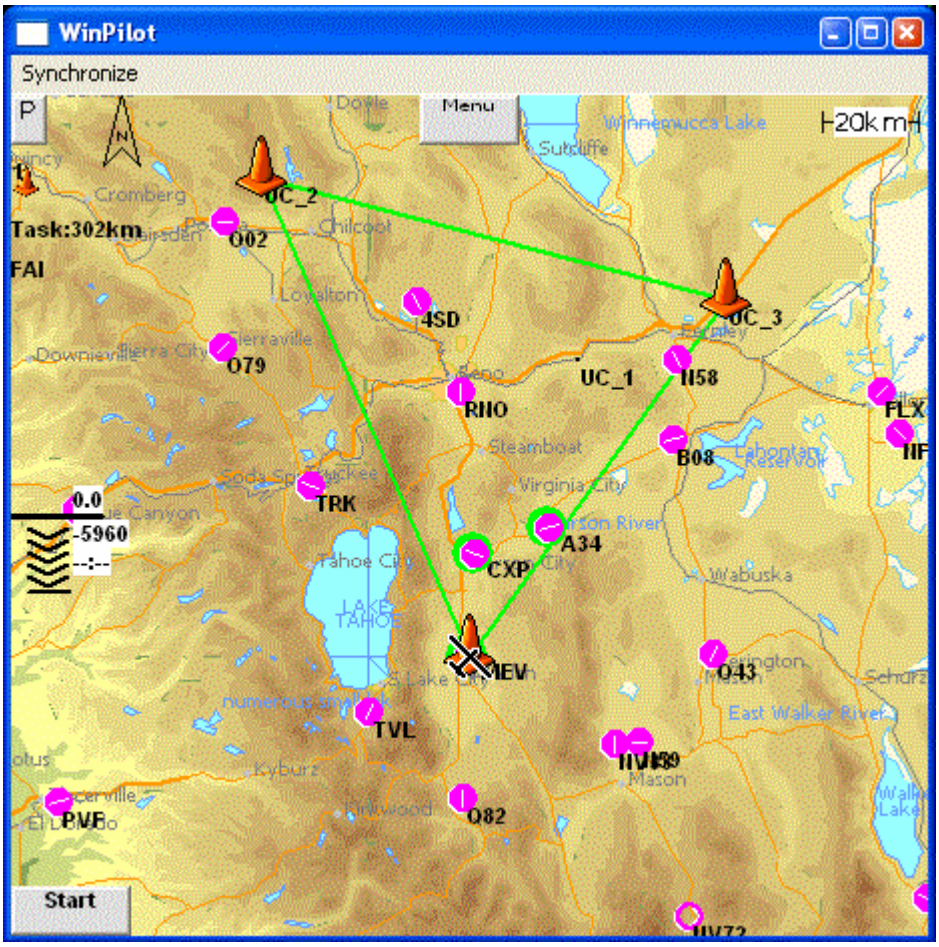
4.2.2 Drag and Drop Task Editing

The goal of this feature is to minimize the amount of time the pilot has to spend preparing a task and loading it into the flight computer before takeoff.
After receiving the weather briefing, pilot decides in what general direction the flight will take place, and defines a task in that general area using the existing predefined waypoints like airports, or user turnpoints. Then, the drag & drop task edit feature can be activated to fine tune position of waypoints. If task editing is taking place on the Desktop using WinPilot XP, it is then very easy to transfer the task along with the newly defined waypoints to the Pocket PC by using Data Synchronization.

Drag and drop task editor can be enabled by selecting the following symbol: on the Menu.Flight Plan page. This brings up this setup screen:



Cones:On enables a small cone symbol in the left upper corner of the map screen: . Touching this small cone changes all waypoints of the task into big red cones that can be freely moved around the map and set at any desired position using a mouse, or a finger on the Pocket PC (see example below). While the cones are dragged, WinPilot constantly calculates the distance of the task, and shows it in the left upper corner of the map (302km in the example below). If the task is a triangle, WinPilot checks if the triangle meets FAI requirements. FAI triangles are shown with green task lines, non-FAI tasks are shown with red task lines. Also, for FAI triangles words 'FAI' are displayed below the task distance, as in the example below.
When a cone-waypoint is dropped close (less than 2km away) from an existing airport or user-defined waypoint, it snaps-on to that waypoint.



Starting with version 4.27, it is possible to specify an option to make the Cones always **snap on to an existing waypoint**. This option can be enabled on Flight Plan page by clicking the cone symbol.

4.2.3 TASK page

TASK page has been introduced in WinPilot version 4.50 to simplify setting and managing tasks when the full power of Flight Plan page is not needed. This editor always operates on task 00 and has these functions:

1. **Advancing or going back within a task**
To use this function press a button on the left next to the name of task waypoint from which the task should be flown. Symbol' >>' shows the currently active waypoint (Cerro Gordo in the example above).

2. **Modifying waypoints of the task**
In this mode it is possible to rapidly replace or add new user waypoints to the task.
Pressing a button brings up a keyboard, and the user can enter one of two things: waypoint ID (the first number describing a waypoint in the *.dat file), OR, first letters of the name of the waypoint. Please note that if multiple waypoints start with the entered text, WinPilot will select the first matching name. Note that this function ONLY searches names and IDs within the USER WAYPOINT FILE.

3. **Defining and editing Areas** for task turnpoints (useful for Assigned Area Tasks and Turn Area Tasks). To define or edit an AREA for a given turnpoint, click on its name to invoke Keyboard, and enter '.' (single DOT).
This way is an alternative to the defining Areas via Menu.Flight Plan, selecting a waypoint, and clicking WPT.AREA.

4.2.4 Importing Tasks and Waypoints from SeeYou and StrePla

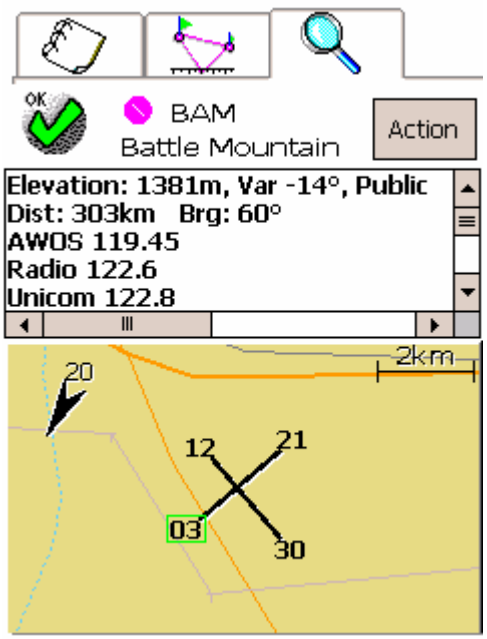
There are two ways of doing this:

A. Automatically using WinPilot XP (Lite or full version):

1.Install WinPilot XP from our web site.
2. Click Synchronize, and select your SeeYou or StrePla waypoint file there (SeeYou users should save their waypoints and tasks as *.cup file; StrePla users should save their waypoints and tasks in StrePla Exchange format *.ste).
3. From then on, WinPilot will remember the location of your waypoint and task file, and will import that file into WinPilot on Pocket PC with just one click of a mouse (on the Synchronize button).

B. Manually using ActiveSync.
Users can also drag and drop *.cup or *.ste files manually to Pocket PC using ActiveSync. The files should be put in the top directory (My Pocket PC). When WinPilot ADV or PRO starts, it checks for files named **WinPilot.cup** (waypoints and tasks from SeeYou), and **WinPilot.ste** (waypoints and tasks from StrePla), and if these files are present, it gives the user an option to import them.

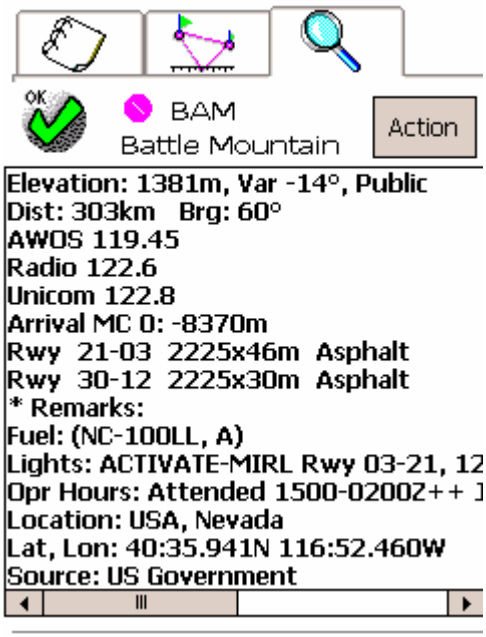
4.3 Details Viewer

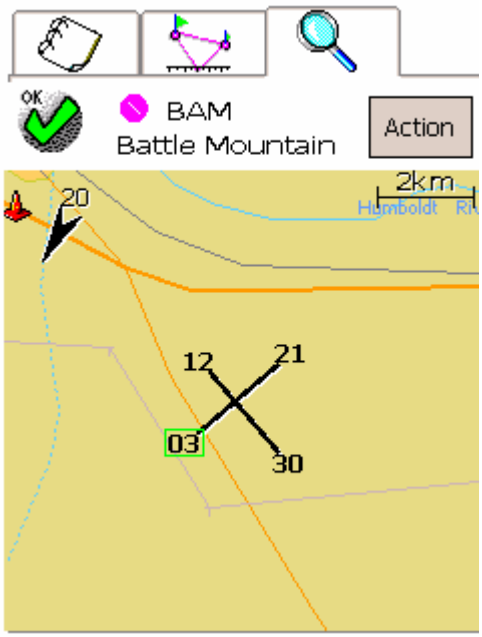


Details viewer presents details of the selected waypoint.
The upper half contains text information about elevation, variation, radio frequencies, available runways, fuel,

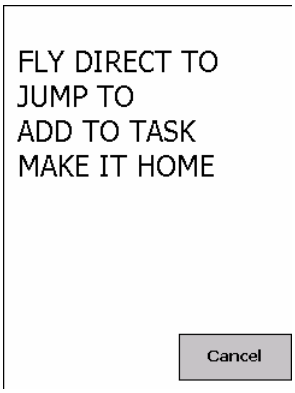
hours of operation, remarks, etc. The lower half contains a map showing the surroundings of the selected waypoint, including runway layout with runway numbers.
To provide a better situational awareness WinPilot shows **wind indicator** and scale next to the airport diagram. For airports from WinPilot database that have runway information, WinPilot now **recommends which runway** should be selected for landing based on the current wind direction. That runway is marked with a **green rectangle** around runway numbers (see above).

To make it easier to see all important information without scrolling, the airport/waypoint info window can be **easily enlarged** by touching it. The same applies to the airport diagram in the lower part of the page.
This can be tested by simply clicking anywhere on the list (or on the map). See example below:





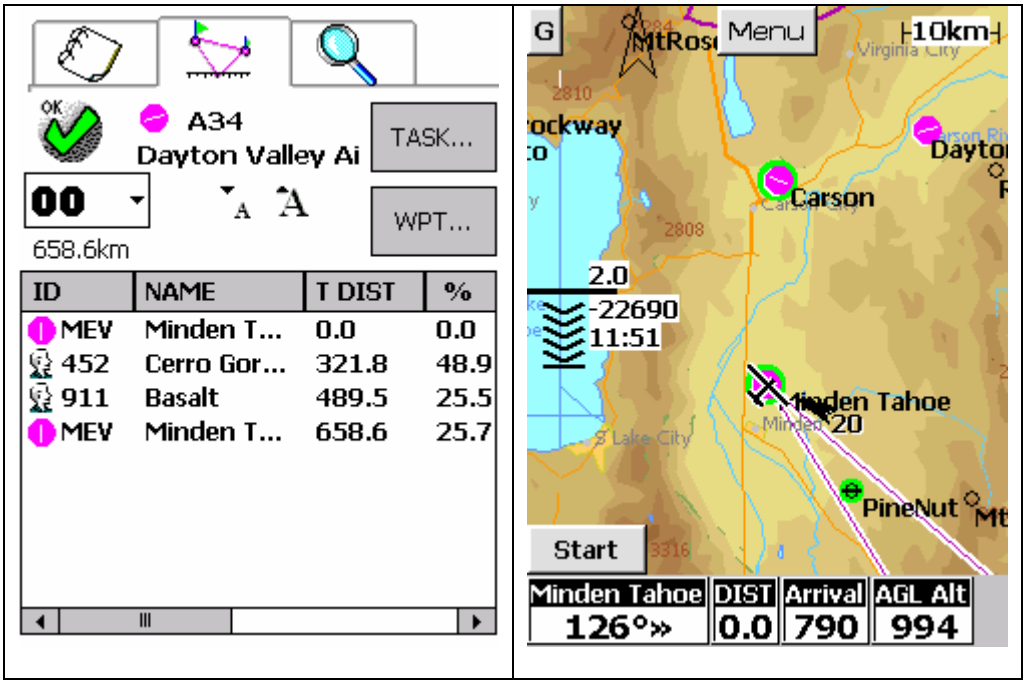
The '**Action**' button on Details page contains the following options:
FLY DIRECT TO – sets WinPilot to navigate to the selected waypoint.
JUMP TO - moves the current position of simulated glider to the given waypoint.
ADD TO TASK – allows inserting this waypoint into any position in the task.
MAKE IT HOME – Sets the Home airport. If there is no task selected, WinPilot will navigate to this waypoint by default.



5 Flying a Task

Once a task is created (using methods described above), a button '**Start**' will appear in the lower left corner of the map. The task can be started by either pressing this button, or by touching the chevrons on final glide display, and pressing 'Start Task' there. After a start, the current leg will be shown with a thick magenta line. When glider flies through the start line, the task will be automatically started. To prevent automatic start, user can enable button '**Arm Start**' on **Menu.Settings 2**. Auto start will not operate until user presses 'Arm Start'.

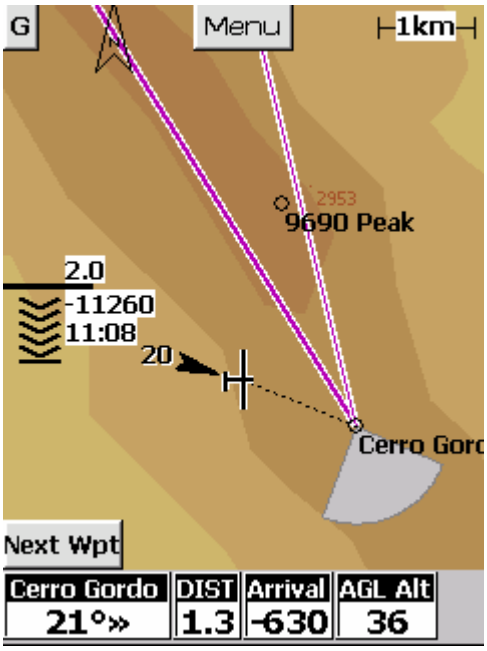
Here is a sample flight plan and a map before task is started:



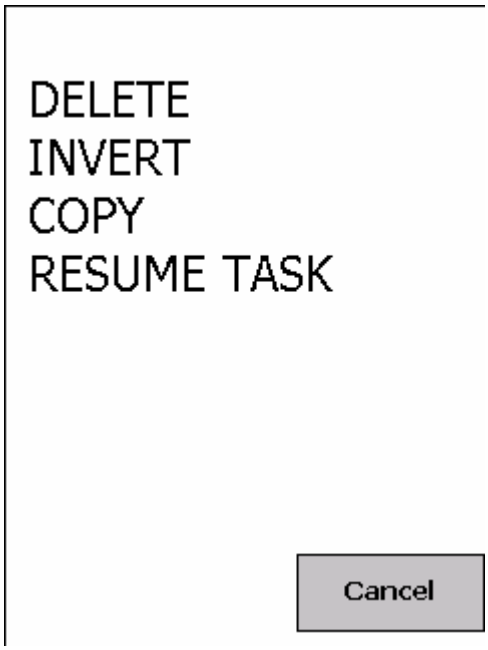
Initially, WinPilot navigates directly to the first waypoint of the flight plan (MEV – Minden Tahoe in the example above). The chevrons on the left show the final glide information around all the waypoints in the task for a given MCready setting. In the example above, MCready setting is set to 2.0, and the glider needs 22690m more to round all the waypoints and arrive at the finish. The ETA at the finish is 11:51.

After the task is started, when the glider gets close to the next waypoint, a button appears in the lower left corner of the map with text '**Next Wpt**'. Pressing the '**Next Wpt**' switches WinPilot to navigate to the next waypoint. If the Menu.Settings2.AutoAdvance option is on, then WinPilot will advance automatically to the next waypoint once there is a gps fix inside sector set in Menu.Rules.

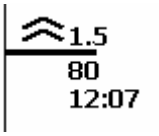
WARNING: FAI regulations for rounding turnpoints during a badge or record flight are different from those of most soaring contests. When flying a badge or record flight, please make sure that you have Menu.Rules.Turnpoint Control.Angle set to 90 degrees. Most contests require a 360 degrees cylinder, and a radius of around 500m (check the contest rules). Picture below shows a 90 degree sector at a turnpoint.



Instead of flying to next waypoint on the flight plan, it is possible to select any other waypoint as a '**Fly Direct To**' destination. The '**Fly Direct To**' option is available on Details page of a given waypoint under **Action** menu. The active flight plan gets suspended, and WinPilpot navigates to waypoint selected as Direct To destination. Flight plan can be resumed on the Menu.Flight Plan.Task page by selecting '**Resume Task**':

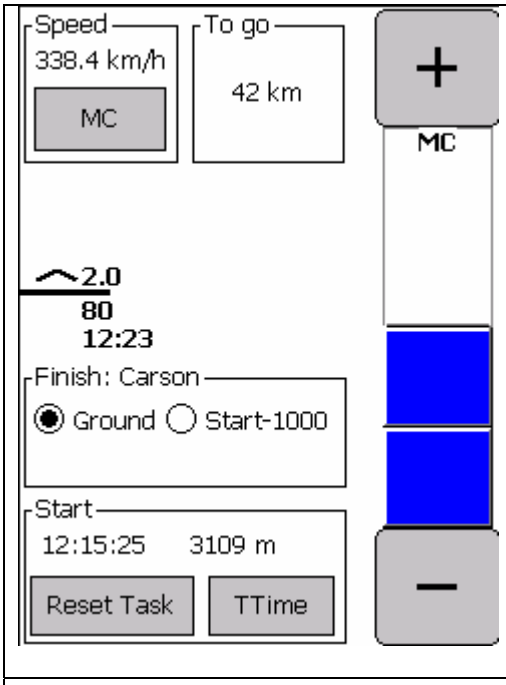


6 The 'Chevrons' screen (McCready page)

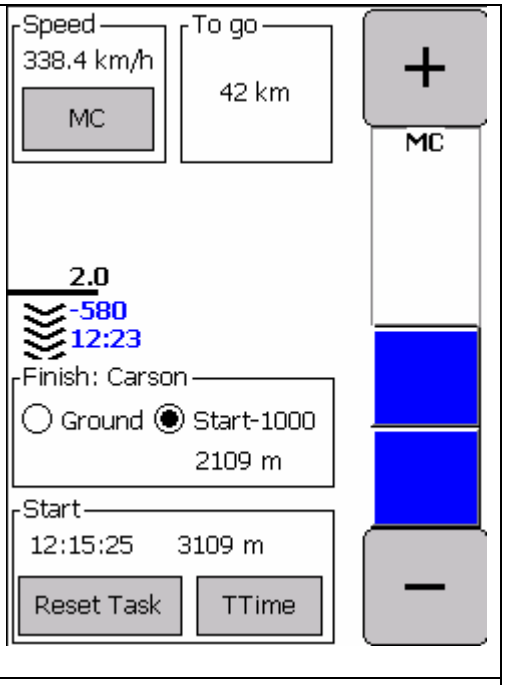


The Chevrons screen can be invoked from the map by touching the 'chevrons':
Touching the chevrons again switches back to the map.

It is possible to select here if WinPilot should calculate final glide to elevation of the goal airport (plus safety margin adjustable on Menu.Settings2.Goal Height), or to Start altitude minus 1000 meters, which can be useful for flying FAI badges and records. When such a flight is finished at altitude more than 1000m below start, a penalty specified by the FAI applies. However, if the finish altitude is much higher, then the pilot sacrifices cross-country speed. Therefore, it is optimal to finish at an altitude slightly higher than start - 1000m.



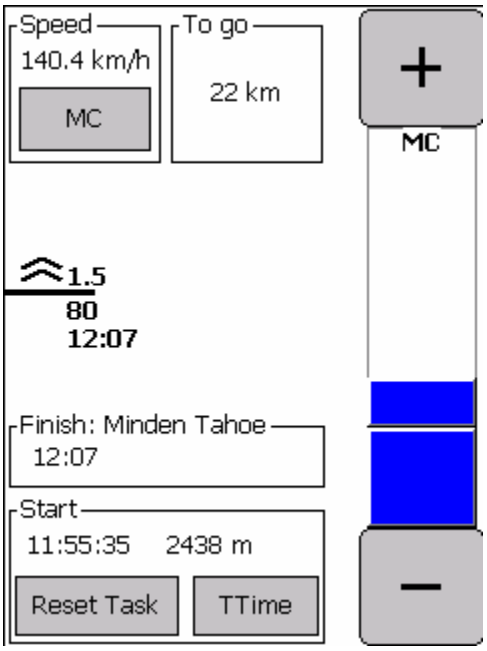
Final glide set to finish elevation (plus safety margin).



Final glide set to Start altitude minus 1000 meters.

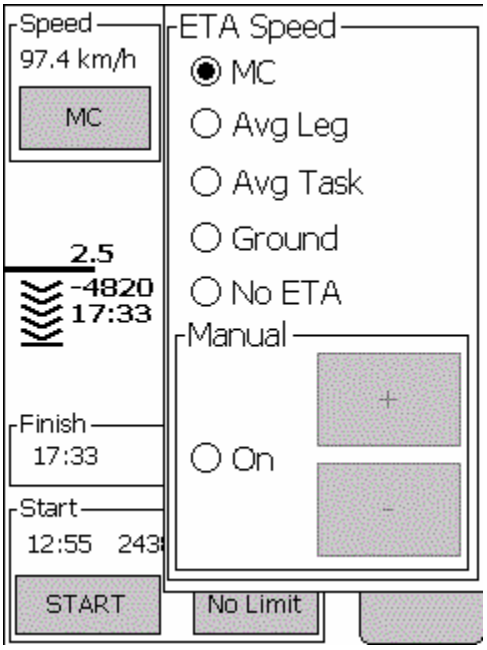
In the example above, the start altitude was 3109 meters (typical Minden day ☺), and start time was 12:15:25. On the left side pilot has selected final glide to the elevation of the finish, and on the right, the final glide is set to altitude of 1000 meters below start altitude (3109m – 1000m = 2109m, which is shown in the Finish box).

On this screen it is also possible to change the current McCready setting by pressing '**+**' or '-' buttons, or by **touching the blue bar** at the desired setting. From this page it is also possible to Start a Task by pressing the **Start** button. If a task has already been started, it is possible to reset it here. Above the **Start** button, start time and start altitude are shown.
By pressing the '**TTime**' button it is possible to set task time. If task time is not set, the ETA box shows the Estimated Arrival Time (12:07 on the picture on the right). If task time is set, the ETA box shows the **difference** between Estimated Arrival Time, and the Desired Arrival Time (which is Start Time + Task Time).

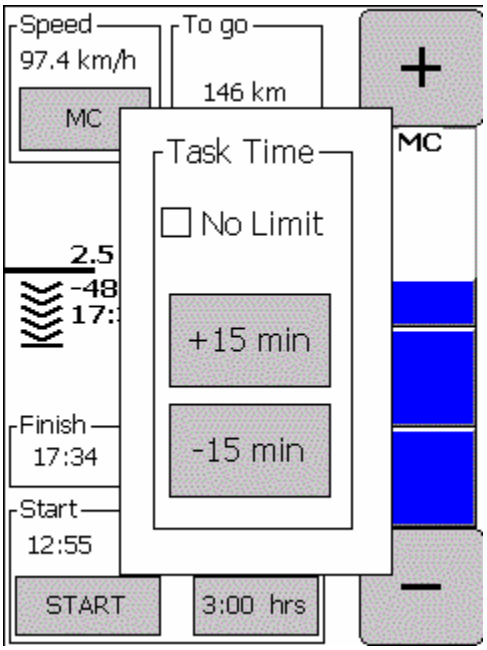


Pressing the '**MC**' button allows selecting what kind of speed is WinPilot using for computing the ETA (see below).

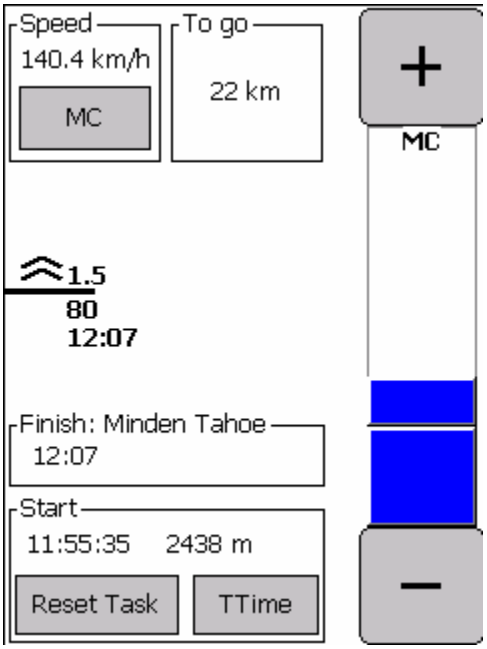
MC button pressed: a dialog showing different kind of speed for selection in computing the ETA is shown. The possible choices here are:



- **MC:** the theoretical cross-country speed corresponding to the current MC setting
- **Avg Leg:** Average speed on the current leg
- **Avg Task:** Average speed on the whole task so far
- **Ground:** Current ground speed (useful in the final stages of a final glide)
- **No Eta:** ETA box is not shown at all
- **Manual:** the pilot can estimate the cross-country speed for the reminder of the task himself by pressing the + or – buttons



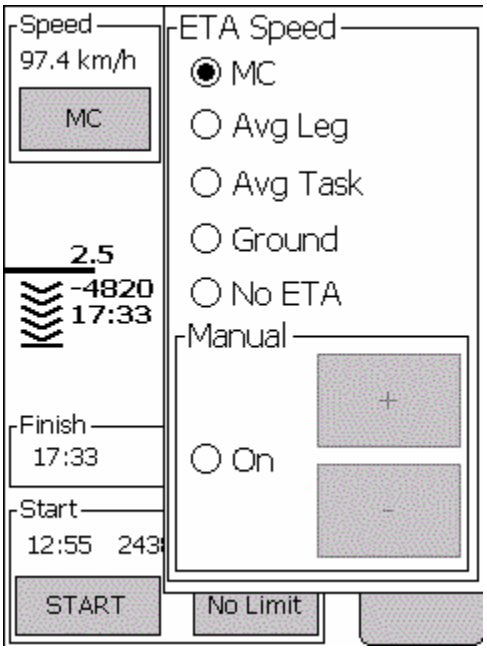
TTime button pressed: it is possible to set the task time here in increments of 15 minutes. If task time is set, the ETA shows the Estimated Arrival Time (17:33 on the picture on the right). If the Task Time is set, the ETA box shows the difference between Estimated Arrival Time, and the Desired Arrival Time (which is Start Time + Task Time).



On this screen it is also possible to change the current McCready setting by pressing '**+**' or '-' buttons, or by **touching the blue bar** at the desired setting. From this page it is also possible to Start a Task by pressing the **Start** button. If a task has already been started, it is possible to reset it here. Above the **Start** button, start time and start altitude are shown.
By pressing the'**TTime**' button it is possible to set task time. If task time is not set, the ETA box shows the Estimated Arrival Time (12:07 on the picture on the right). If task time is set, the ETA box shows the **difference** between Estimated Arrival Time, and the Desired Arrival Time (which is Start Time + Task Time).

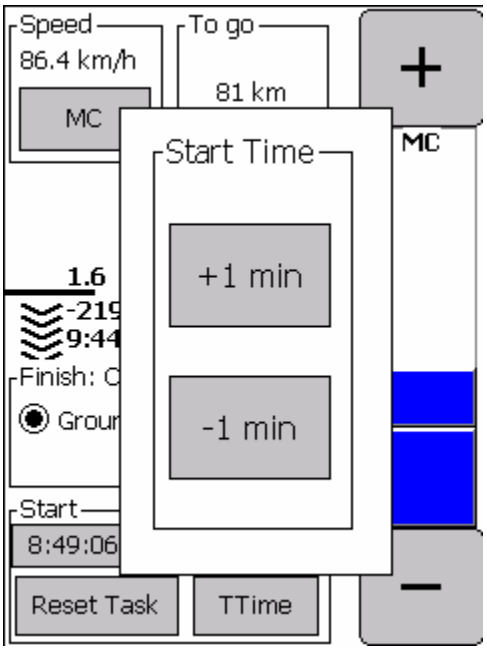
Pressing the '**MC**' button allows selecting what kind of speed is WinPilot using for computing the ETA (see below).

MC button pressed: a dialog showing different kind of speed for selection in computing the ETA is shown. The possible choices here are:



- **MC:** the theoretical cross-country speed corresponding to the current MC setting
- **Avg Leg:** Average speed on the current leg
- **Avg Task:** Average speed on the whole task so far
- **Ground:** Current ground speed (useful in the final stages of a final glide)
- **No Eta:** ETA box is not shown at all
- **Manual:** the pilot can estimate the cross-country speed for the reminder of the task himself by pressing the + or – buttons

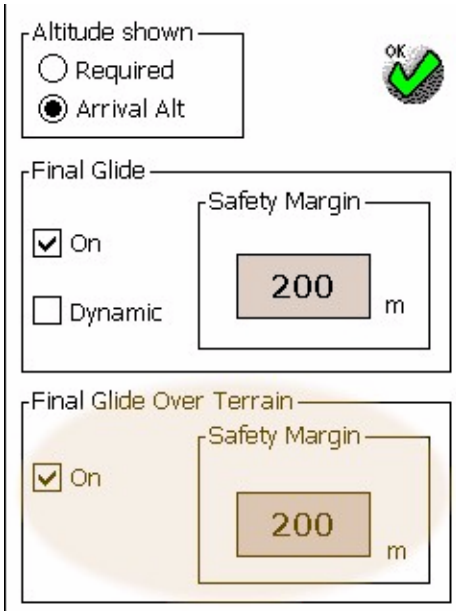
Start Time button pressed: it is possible to adjust task start time here in 1 minute increments . This is useful if pilot has forgotten to press the Start button when starting a task.
I the example on the right, the Start Time button shows 8:49:06, and when that button is pressed, the 'Start Time' adjustment window appears. To dismiss that window, the start time should be clicked on again.



7 Final Glide Over Terrain

Starting with version 5.0, WinPilot allows taking terrain into consideration when computing final glide for the current task. This is done to detect situations where final destination cannot be reached, because there is high terrain or a mountain between glider and the goal, making the goal unreachable from the current altitude.

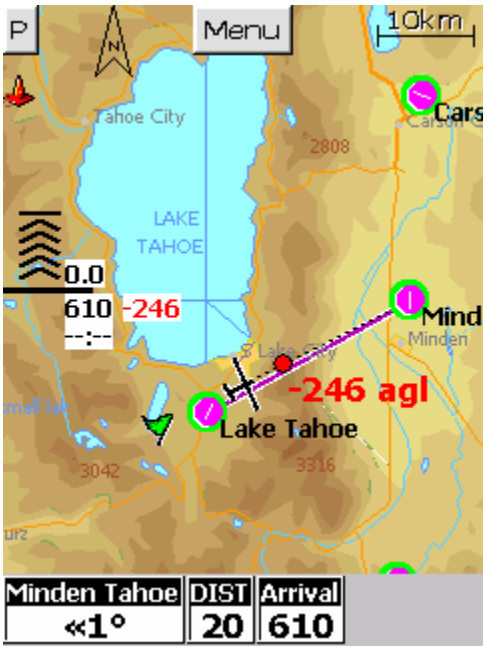
Final Glide Over Terrain feature can be enabled on Menu.Settings2 page by pressing 'Final Glide' button, or directly from the Menu by selecting 'Final Glide' (if button 'Final Glide' has been selected into main Menu). Please note that since terrain elevation data is contained in map files, Final Glide Over Terrain feature will only be enabled when a map file (extension *wp3) is available for the whole area over which the flight is being performed.
The safety margin makes the terrain higher by the specified number. Given the accuracy of the terrain data, it is advised to set the margin to at least 100 meters, or more.



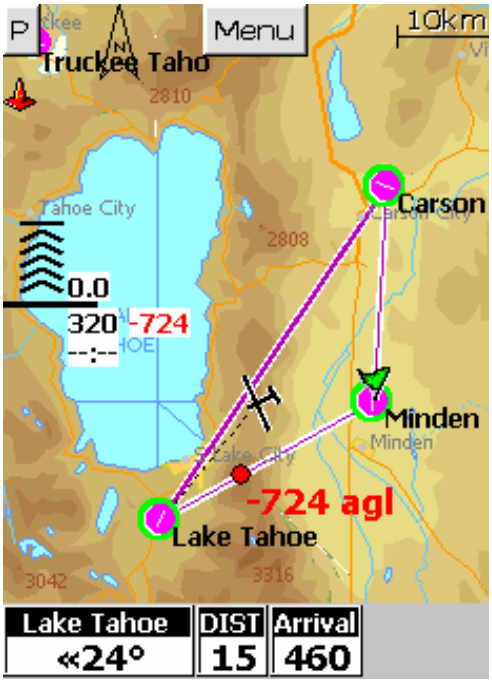
Final Glide Over Terrain Disabled.

Final Glide Over Terrain Enabled.

Example on the right shows Final Glide Over Terrain feature in action. First, the 'regular' final glide data is shown (as in previous versions of WinPilot) which here reads **610** – which means that if there were no obstacles between glider and the goal, the glider would be 610 meters above final glide slope. Next to that number is shown a red number **-246**, which means that the final glide track intersects at some point the terrain at -246 meters below mountain level. The exact point where the final glide slope is the lowest below terrain is shown with a red dot (visible on the example here between Tahoe and Minden).



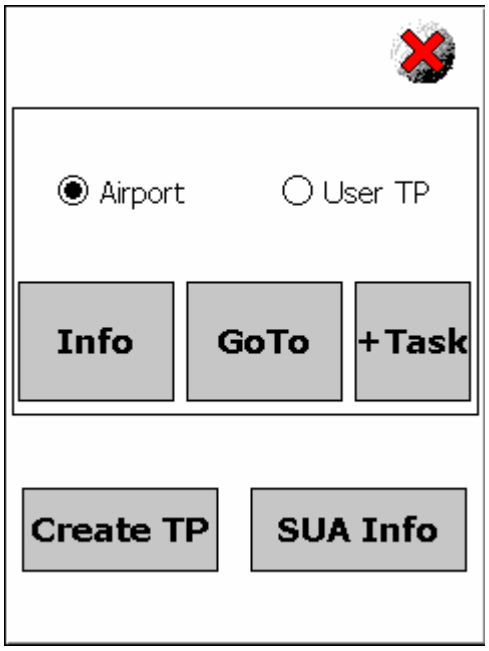
Another example: Here the task is: Minden – Carson – Tahoe – Minden, and the glider is on Carson-Tahoe leg. Without taking terrain into consideration, the glider is **320** meters above final glide slope. However, taking the terrain into consideration, the glider is **724** meters below final glide slope.



Please note that Final Glide Over Terrain feature works for tasks being flown, it does not work for airports/landing sites that are not part of the task.

8 Touch Page

Touch page makes it possible to pre-select which map items should be sensitive to a touch:



For example, if the pilot wants to GoTo to some Airport, he can select Menu.Touch.GoTo (with the Airport type being selected in the upper part of the screen), and then when he touches the map, WinPilot will find the closest airport to the place where the map was touched, and invoke the GoTo function to that airport. The upper part of this page allows selecting what entries should be selected (Airports or User Waypoints), and the lower part specifies what action to take. It is not necessary to be precise in touching an item, WinPilot will automatically find the closest airport/waypoint to the place where the map was touched.
Available functions:
Info - displays Details page about the touched Airport/Waypoint.
GoTo - makes WinPilot navigate to the Airport/Waypoint that will be touched on the map.
+Task - inserts Airport/Waypoint into Task 00 (it is possible to specify at what position should the insertion be made).
Create TP - creates a new user waypoint where the map is touched.
SUA Info - displays information about next touched Airspace segment. It is not necessary to touch airspace label, the whole airspace segment is sensitive to a touch when this function is invoked. The label contains distance to the selected airspace, which is updated in real-time. So, for example when flying near airspace, pilot can select it using the Touch function and observe the distance remaining to that airspace.

WinPilot now automatically assigns the **Touch** page to the third iPAQ button (this can be reassigned via Menu.Edit).

9 Using Go To

The GoTo function can be invoked to make WinPilot navigate to a waypoint that is not part of a task.
This function can be activated in several ways:

1. Directly from the Map page: A small button in the left upper corner of the map controls the mode of the map. If the button reads '**P**', then dragging a finger on the map causes the map to move in the direction of the drag. If the button reads '**G**', then dragging a finger on the map invokes a list of waypoints in a given direction. Note: after selecting a waypoint from that list, it is sufficient to click OK to activate it, it is NOT necessary to go through the steps below.

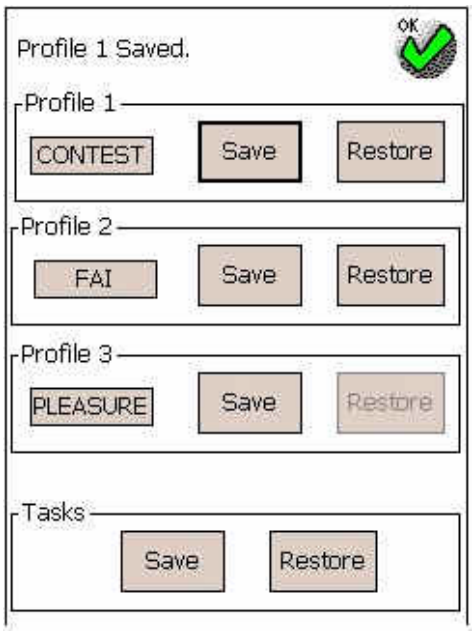
2. From the Waypoint Browser page: click Menu.Waypoint Browser, select the waypoint of your choice, switch to Details page (third tab), and select '**Fly Directly To'.**

3. From the **GoTo** page: if the pilot has selected **GoTo** page into the Menu using (Menu.Edit), then he can press the **GoTo** menu button, select a waypoint, and press OK to make WinPilot navigate to it.

4. From the **Touch** page: click Menu.Touch (or press third hardware button) to see the Touch page, select GoTo. The Map page appears again, and the first waypoint/airport touched on the map becomes active.

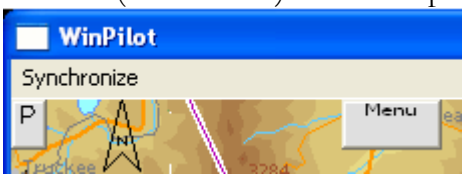
10 Switching configurations using Profiles

Menu page **'Profiles'** implements a mechanism to preserve settings of the program in case of battery discharge. Three separate sets of settings can be saved and restored. This mechanism can also be used to quickly change settings for different modes of flying defined by the user, for example from competition mode to flying FAI tasks mode, and/or to quickly change the set of active NavBoxes. It can also be used to store settings for different pilots in case there is more than one pilot using a particular iPAQ.
The settings are stored in non-volatile memory available in iPAQs 3800, 3900, 5000 series and newer in folder 'iPAQ File Store'. Users of older iPAQs like 3600 can use a compact flash card to save settings.
This page also allows saving and restoring tasks.
To activate the page, go to Menu.Edit and enable **'Profiles'** into one of the buttons.
To switch between different Profiles with just one touch, user can assign functions '**1Prof**' and '**2 Prof**' to any of the front buttons of the Pocket PC device, and then switch between profiles by pressing button for the appropriate profile.

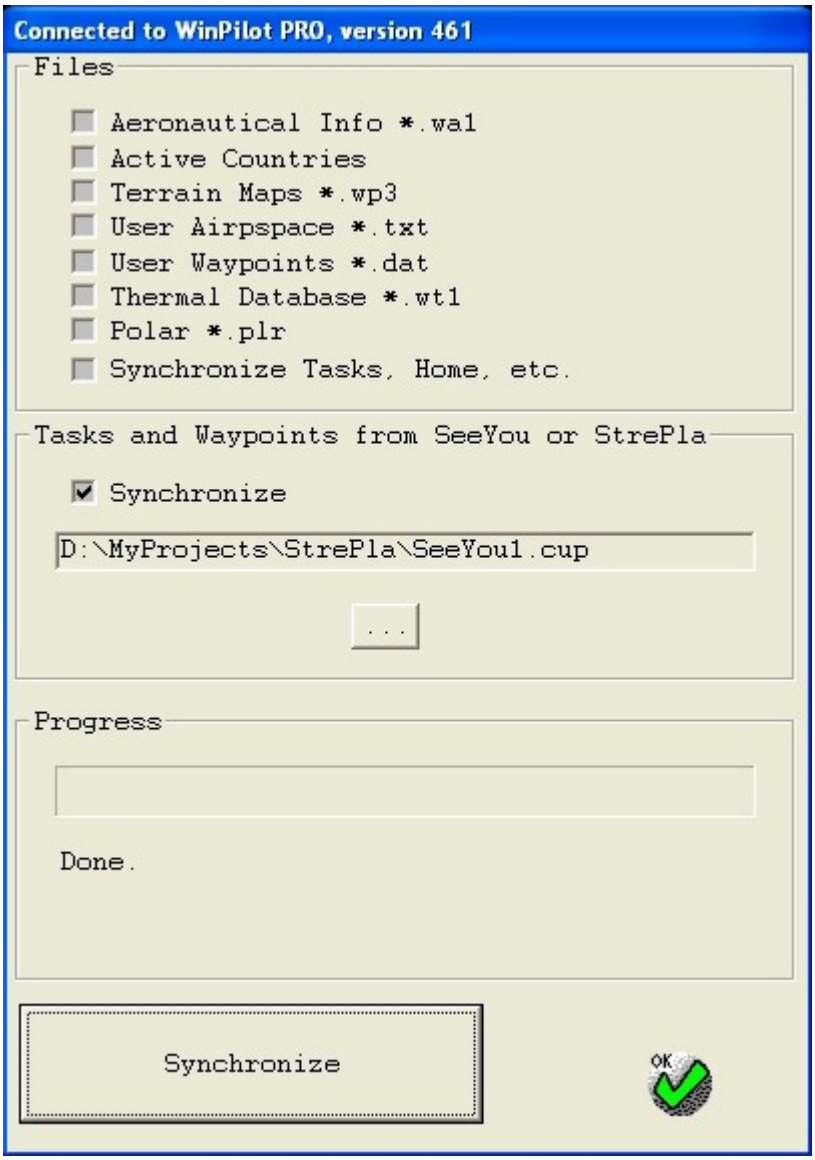


11 Data Synchronization from desktop PC to Pocket PC

This feature has been introduced for pilots who have access to desktop PC before flight. It can be used to simplify setup of the Pocket PC, or transferring tasks from desktop to the Pocket PC. The desktop version of WinPilot (WinPilot XP) contains a special menu item called 'Synchronize'



that invokes Synchronization Dialog Page:



On this page it possible to specify which items should be transferred from desktop to the Pocket PC. For owners of the desktop version of WinPilot, it might be easier to first set up their WinPilot on the desktop, and then use Data Synchronization to transfer all the selected files from the desktop to the Pocket PC by clicking the 'Synchronize' button.

Another use of Data Synchronization is to transfer tasks created on desktop PC to the Pocket PC. Given the larger screen size of the desktop PC it might be easier to create a task there, and then use Synchronization to transfer this task to the Pocket PC. This applies both to tasks comprised of predefined waypoints (like existing airports), or to tasks created using the drag and drop task editing feature.

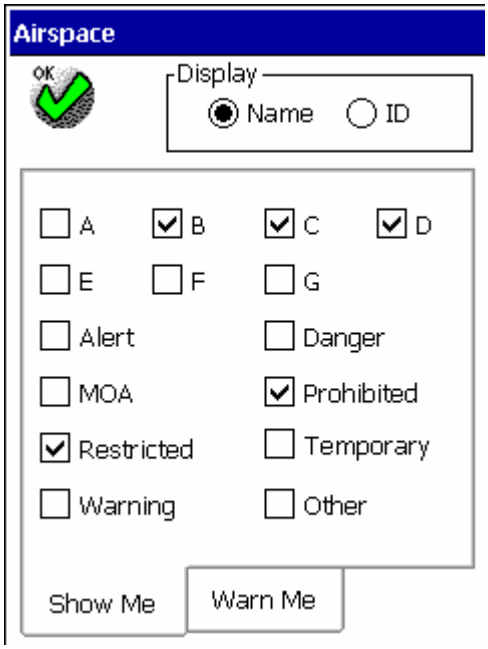
It is also possible to transfer waypoints and tasks from SeeYou or StrePla to WinPilot, see Importing Tasks and Waypoints from SeeYou and StrePla for more details.

12 Airspace

Airspace in WinPilot can come from two sources: WinPilot database (extension ***.wa1**), or user's file in OpenAir format (extension ***.txt** – see Appendix for a detailed description of OpenAir format).

12.1 Airspace from WinPilot database (*.wa1)

This airspace is managed via Menu.Airspace screen:

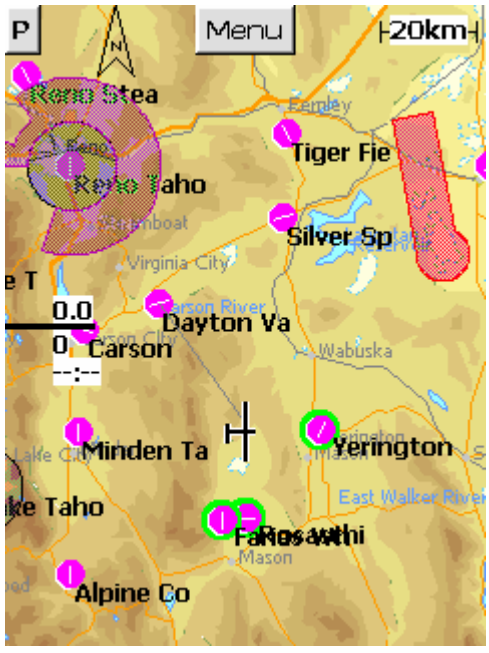


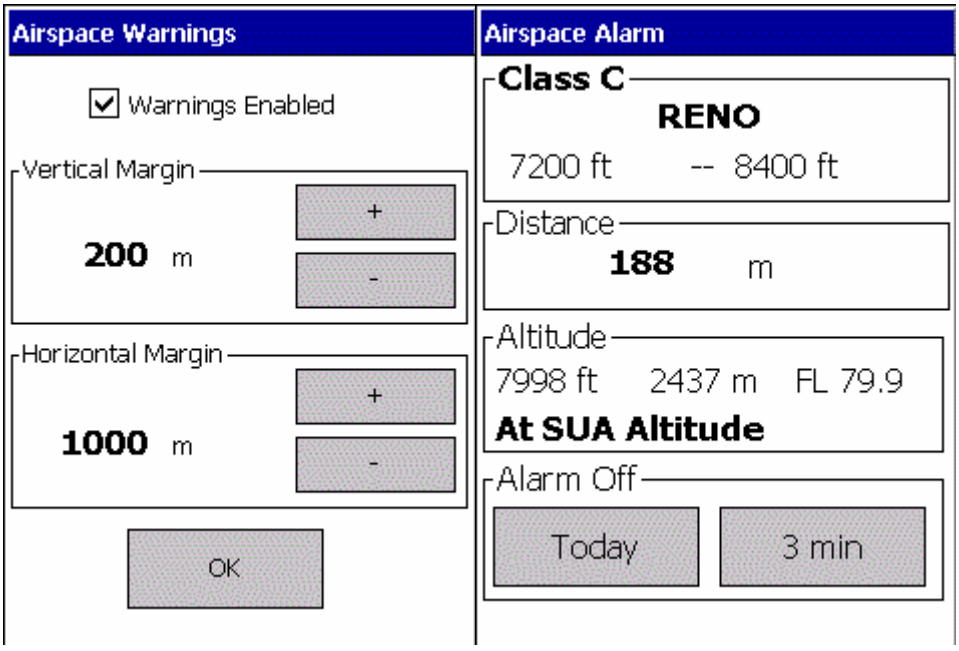
It is possible to specify if a full name (**Name**), or just the id (**ID**) should be shown on the map. Also, it is possible to specify here which airspace classes are visible (**Show Me**), and for which classes an Airspace Warning should be generated (**Warn Me**).

12.2 User's Airspace

User's Airspace can be added via Menu.Files.Additional Airspace.
The '**Menu.User Airsp**' page allows selecting which user airspace types should be shown on the map and generate warnings. If a given type is greyed out, this means that there is no airspace segments of that type on the map. User Airspace selection is not preserved between program invocations, i.e., all airspace types are enabled when program starts.
The '**See through**' option makes the underlying terrain map visible through the user airspace (see sample map on the right below).

The '**Warnings**' group allows configuring Airspace Proximity Warnings both for user and database (*.wa1) airspace. Click '**Configure**' to see '**Airspace Warnings**' dialog allowing setting the vertical and horizontal distance margin that triggers a warning. Once a warning is triggered, an '**Airspace Alarm**' page appears (see below). From this page it is possible to disable a given airspace segment for either the entire day ('press '**Today**'), or for the next 3 minutes (press '3 min'). To immediately re-enable warning for that segment, select it on the Menu.Airspace.OFF List page.





13 Thermal Finder

Thermal Finder is a new technology to enhance probability of finding thermals in areas where no visible thermal clues are available. Sierra SkyWare has a Pending Patent for this technology.

A set of flight data logs from past flights performed over a given area is analyzed, and a list of places on the ground that have generated thermals is produced. To find a location on the ground that has generated a given thermal, WinPilot takes in the consideration altitude above the ground where the thermal was found, wind speed and direction, and the strength of the thermal. Then, it projects the location where the thermal was found to the ground, given the above variables. Note that this is very different from simply marking the gps position where the thermal was found in the air. Because of the drift that the wind is causing, simply marking the air position of a thermal does not accurately point to the ground source that generated that thermal, and therefore, it is of limited or no use in subsequent flights, where the wind speed, direction, and glider's altitude are different.

Our Thermal Finder technology attempts to accurately locate the spot on the ground that has generated a given thermal, and then in flight, given the wind speed, direction and the current altitude above the ground of the glider, it starts a thermal at the ground source and projects it upwards, applying the wind drift all the way to the altitude of the glider.

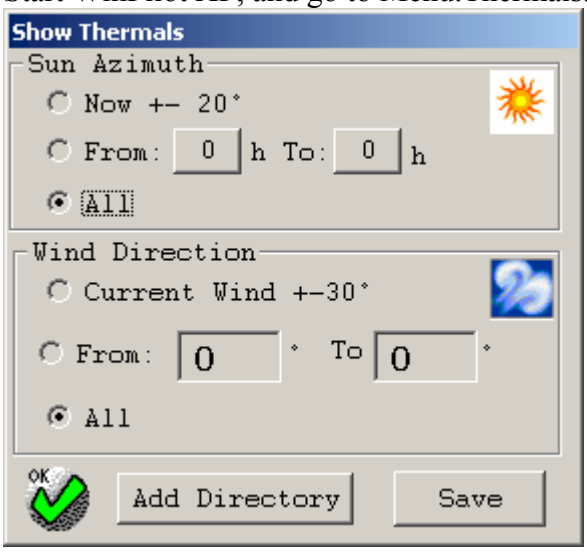
Thermal Finder technology can be useful for flying in the mountains, hilly terrain, or other terrain that has many unique features. It is less useful for flying over homogenous areas, where thermals are generated more randomly. Every pilot has his favorite 'house thermals' that usually are close by to the home airport, and are known to generate thermals more reliably than other places. Thermal database extends this concept to cover areas away from the home airport, where cross-country flights are taking place. It is a result of analysis of several past flights (IGC files) for a given region. The database consist of ground locations that are known to have generated lift in the past.

13.1 Creating Thermal Database

Creation of the database is done by the pilot using the **Desktop (Windows XP) version of WinPilot**. First step is to assemble as many IGC files for a given region as possible – the more files are available, the more accurate the database will be. However, only files flown on days when thermals are generated mostly by ground features should be used. For example, on a day when cloud cover is more than 4/8 of the sky, the thermals tend to be generated by the sunny spots, not necessarily unique ground features. Such days should not be included in creating the Thermal Database. On the other hand, days with no clouds at all, or small cloud coverage are much better candidates. Here are the steps:

1. Create a folder in the desktop "My Documents" (or anywhere else that is convenient). Name it some thing like "c:\MyDocuments\Minden". After each flight download the IGC file(s) and drag-and-drop into the above folder.

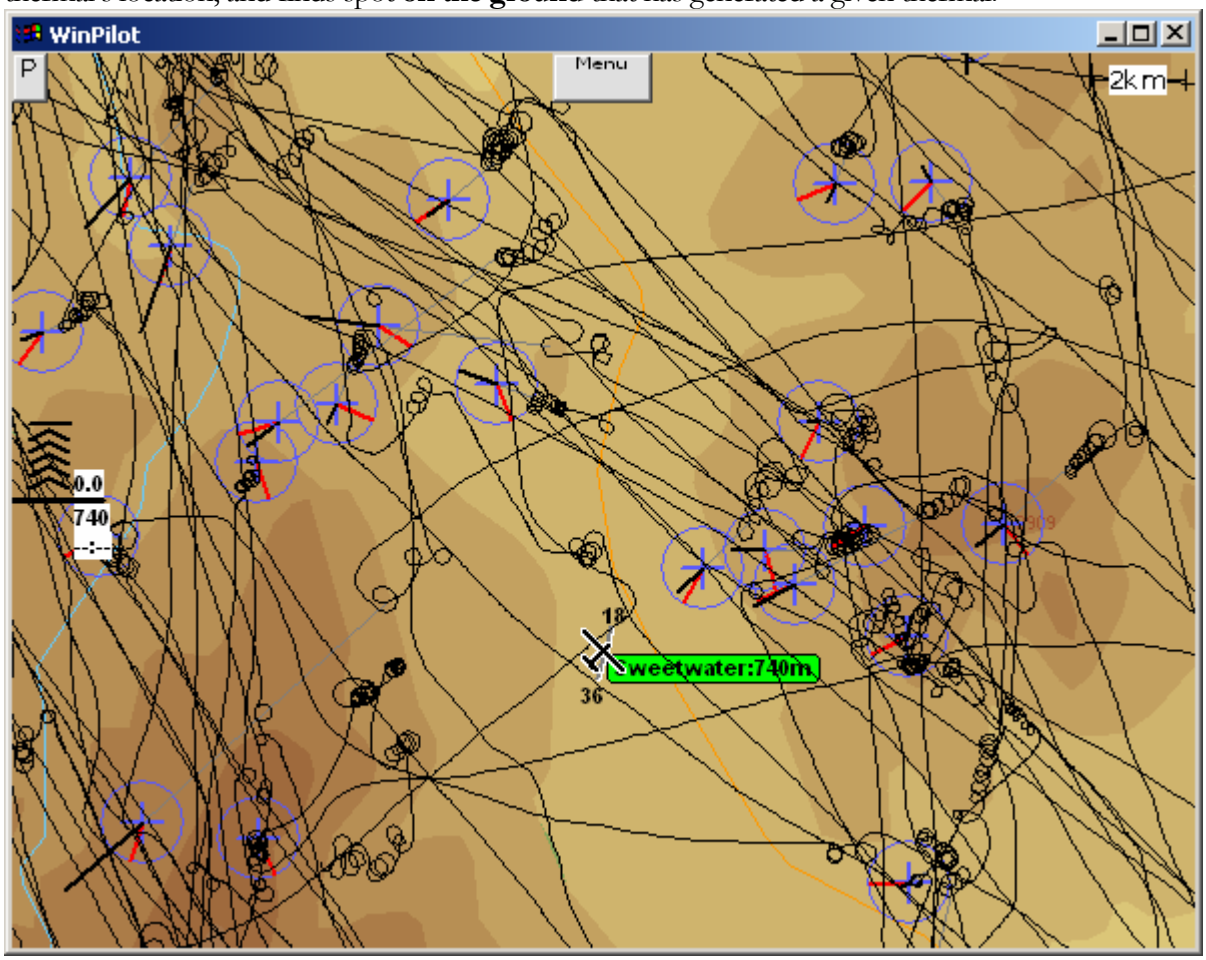
2. Start WinPilot XP, and go to Menu.Thermals. The following dialog will be shown:



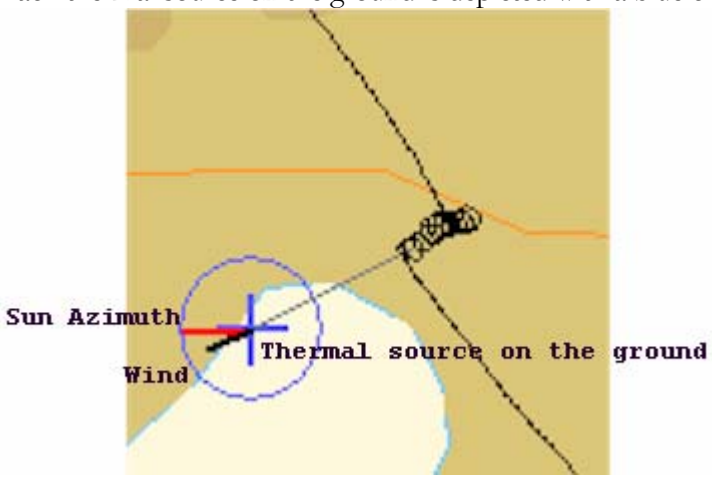
1. Click on '**Add Directory**', and navigate to the directory with IGC files (C:\Minden in our example). Then select a file from that directory (all files from that directory will be added to the database).

2. Make sure you are in zoom level 50 or less. At this point WinPilot XP analyses all the flights, finds thermals, computes wind during each thermal, sun azimuth, ground elevation at the

thermal's location, and finds spot **on the ground** that has generated a given thermal:



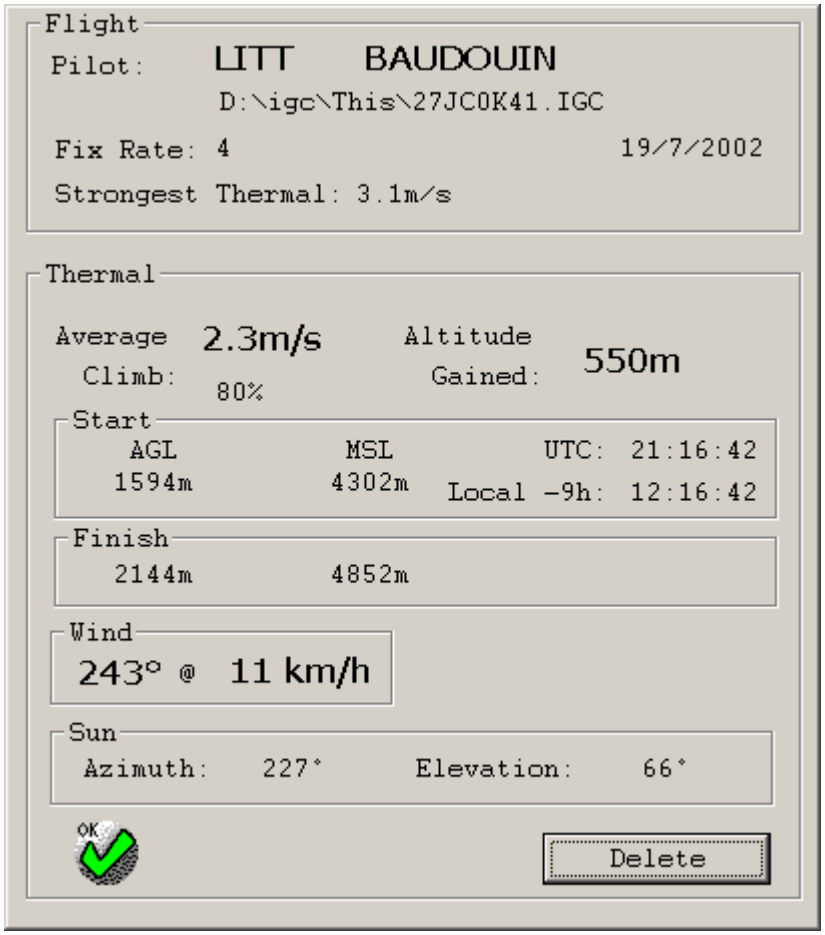
3. Each thermal source on the ground is depicted with a blue cross-hair:



The red line shows Sun Azimuth (from which direction was the Sun shining when the thermal started). Black line shows the current wind speed and direction (the stronger the wind, the longer

the black line). Grey line connects the lift source on the ground with the corresponding thermal in the air.

4. To get more information about a particular thermal, the user can click on it with the left mouse button:



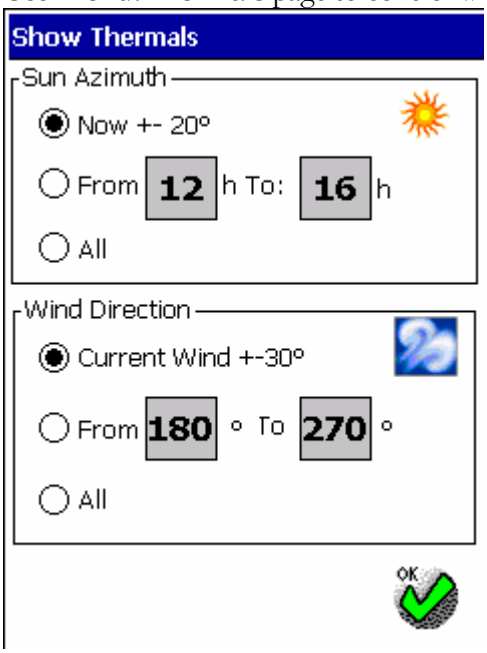
Button '**Delete**' allows removal of the given thermal from the database.
Note: IGC files contain UTC time. This time is shown in the UTC column above. To translate to local time, time zone from user's Desktop PC is used in the 'Local' column. To change time zone on your PC, double click on Windows system clock, and select 'Time Zone'.

5. To save the Thermal Database, click on '**Save**' (see picture in point 2 above). The default file extension is ***.wt1**. After the database is saved, it can be used in flight on a Pocket PC. To do that, start Active Sync, and drag & drop the database file to folder \My Documents on your Pocket PC. Then, start WinPilot on the Pocket PC, go to Menu.Files, and add the file to Menu.Files.Thermals.

13.2 Using Thermal Database in Flight

1. Make sure that the correct Thermal Database is selected in **Menu.Files.Thermals**.

2. Use **Menu.Thermals** page to control which thermal sources should be shown on the map:

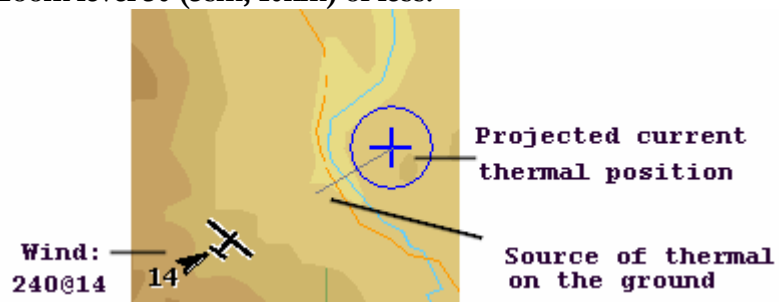


The thermals only show in zoom level 50 (5sm, 10km) or less.
'**Sun Azimuth**' group allows selecting only thermals generated when the sun direction was as specified. **Be sure and set the correct time on you Ipaq or select ALL to see the thermals.** Midnight will not show thermals.
'**Now +- 20 °**' means that the map should show all thermals that have been generated when the sun was shining at the same angle as now, plus minus 20 degrees.
'**From To**' : the program computes what will the Sun angle be at the 'From' hour, and at the 'To' hour, and then selects only thermals that have been generated between these two Sun angles.
'**All**' : all thermals will be shown, no matter when the Sun was when they were generated.

'Wind Direction' group allows selecting only thermals generated when wind direction was as specified.
'Current Wind +- 30°' means that only thermals with the wind direction same as the current direction plus minus 30 degrees should be shown.
'**From To**' : only thermals generated when the wind was from specified directions should be shown.
'**All**' : all thermals should be shown, no matter from where the wind was blowing when they were generated.

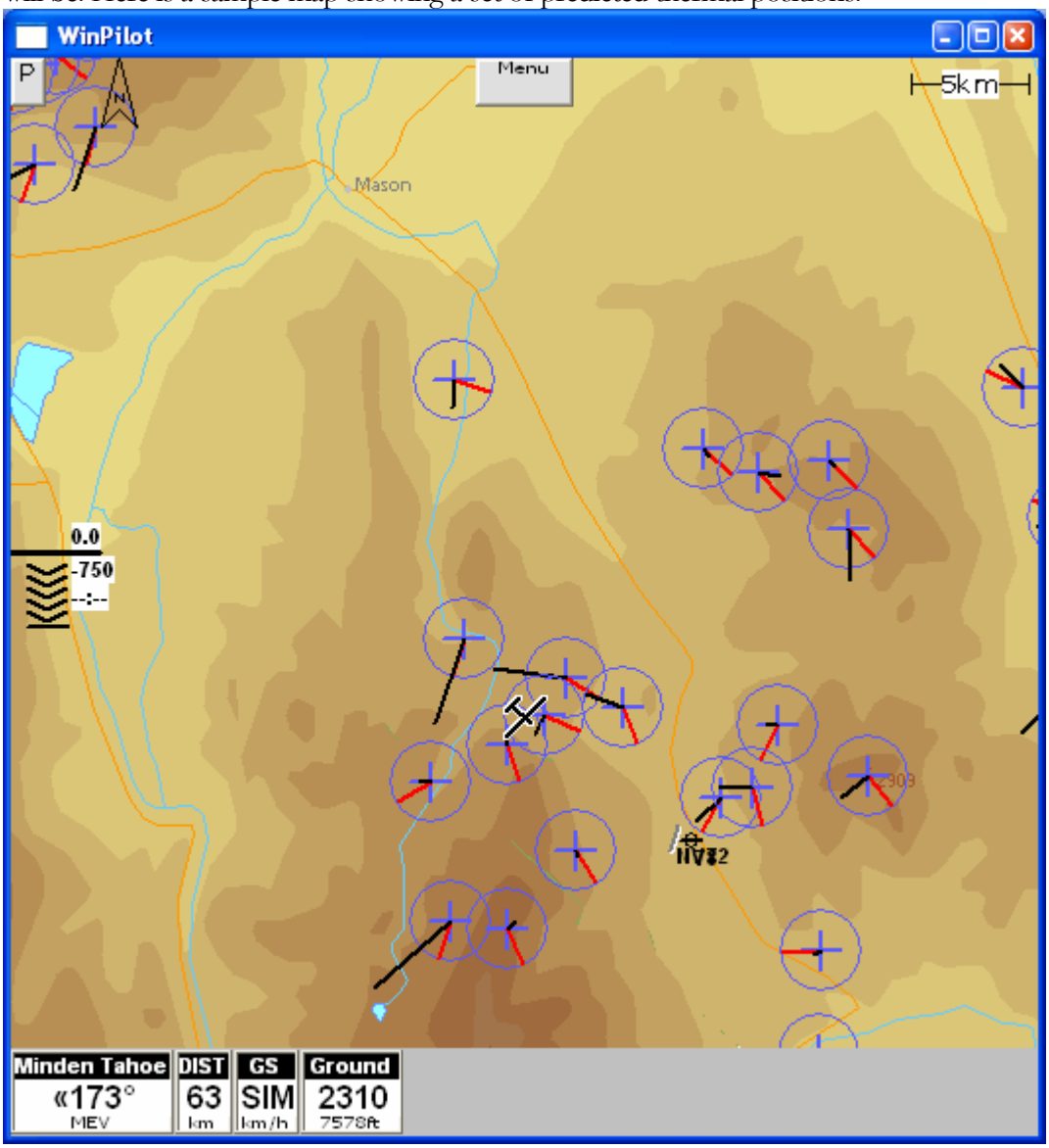
3. The thermal sources selected in Step 2 are then projected up to the current altitude of the glider taking in consideration wind speed and direction, and altitude of the glider: **The thermals only show in**

zoom level 50 (5sm, 10km) or less.



Picture above shows the upwards projection. The place on the ground that has originated the thermal is shown at one end of the grey line (see above), and the projected position of the thermal is shown with a blue circle and cross hairs. In the example above, the wind is blowing from 250 degrees at 14 km/h. Therefore, the thermal position at the glider's altitude is offset downwind. The stronger the wind speed, and the more altitude the thermal has to climb to the current altitude of the glider, the larger the offset

will be. Here is a sample map showing a set of predicted thermal positions:



14 Available Menu Pages

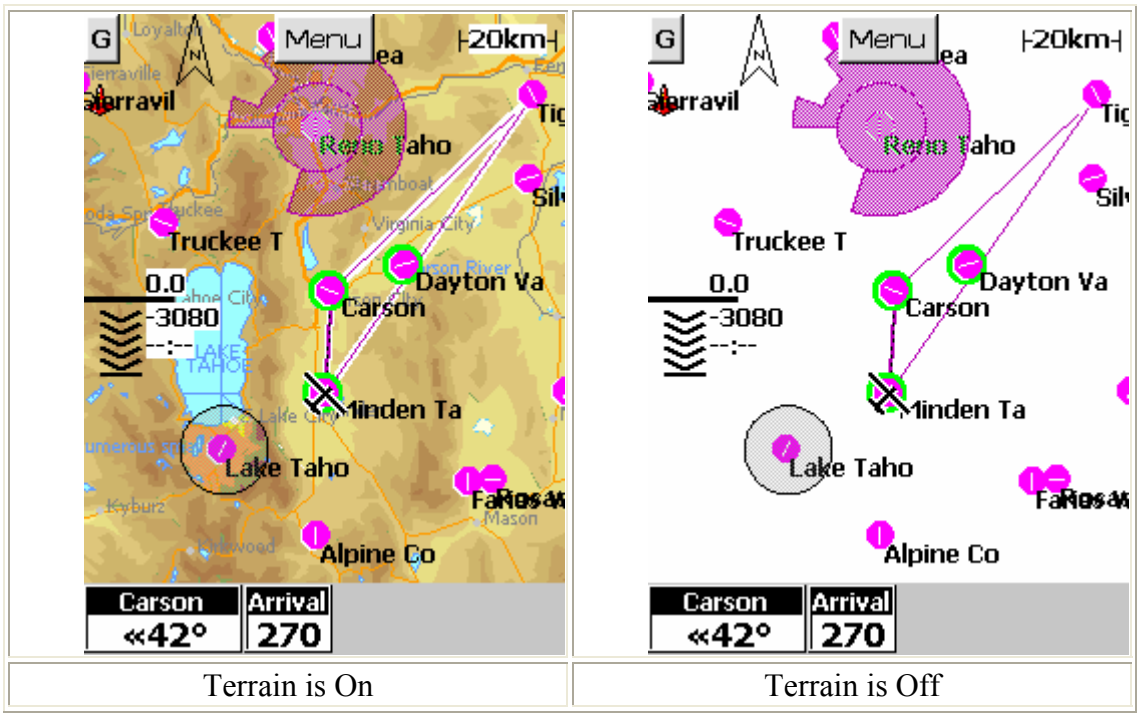
WinPilot Menu system is fully configurable. Any function can be assigned to any button using Menu.Edit, and then pressing a button on the Menu and selecting a function for that button from the drop-down list of Menu functions.

14.1 On – Off Menu functions designed to be assigned to front buttons of a Pocket PC.

There are some Menu functions that has been especially designed to be assigned to one of the four front buttons of a Pocket PC (most Pocket PCs have these buttons located right below the screen).
These functions usually start with '1'. Here is the full list:

'**1 CMax**' = Climb Maximizer On/Off. This function is available only in WP PRO, and allows fast removal of Climb Maximizer from the screen, for example to observe start line or a waypoint sector. This button is now by default assigned to the second iPAQ hardware button (this can be reassigned via Menu.Edit).

'**1 Map**' = Terrain On/Off . This button can be especially useful when near a waypoint or airspace. The pilot can quickly disable the terrain, leaving only task, sectors, and airspace on the map, which makes that info better visible on the screen. This button is now by default assigned to the first iPAQ hardware button (this can be reassigned via Menu.Edit). Example below shows this button in action:



Terrain is On	Terrain is Off

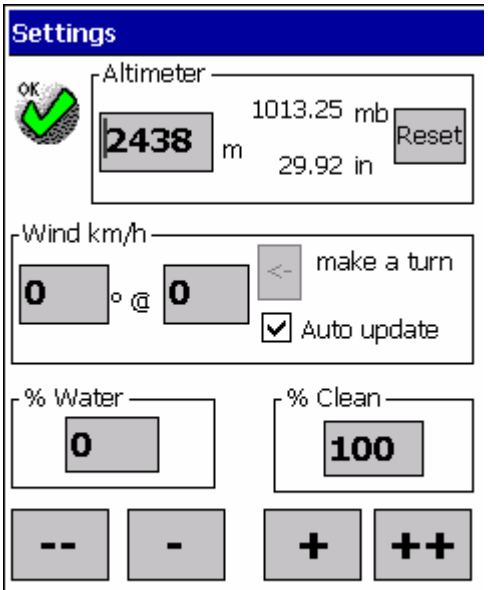
'**Touch**' – allows pre-selecting what items should be active on the map. WinPilot automatically assigns the Touch page to the third iPAQ button (this can be reassigned via Menu.Edit).

'**1 Term**' - displays or hides the predicted by WinPilot position of thermals. This button is only active when a Thermal Database is selected into Menu.Files, and is by default assigned to the fourth iPAQ front button (this can be reassigned via Menu.Edit).

'**1 Team**', '**2 Team**', and '**3 Team**' allow quick entering of team's glider positions (see Team Flying' chapter for more details.

14.2 Settings

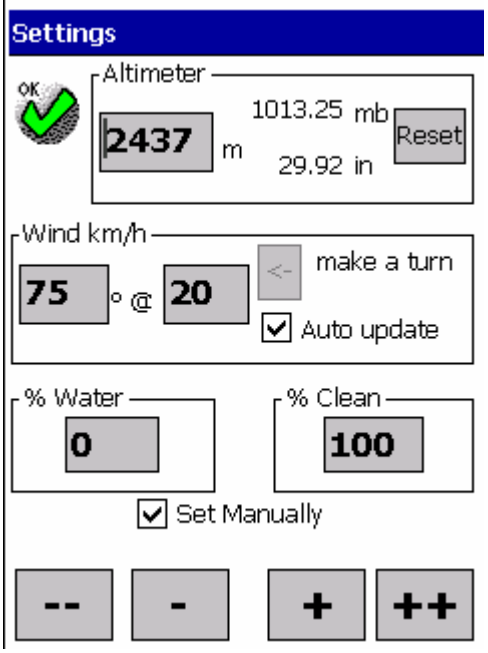
This page allows entering glider related data that could change during a flight, like: wind speed and direction (normally WinPilot computes the wind automatically), water ballast on board (0% - 100%) (absolute ballast capacity is set in polar file), polar degradation due to bugs, rain, etc. - %Clean (70% - 100%; 100% means no degradation), Altitude (altimeter setting).



To change a value, touch it first, and then use the + or – buttons to adjust the value.

WP ADV and PRO have an 'Auto QNH' feature, which sets the altimeter to home airport elevation, if the glider is within 2.5km from the center of the airport, and airspeed is zero.

In WinPilot **PRO** the **Settings** page has an additional check box: 'Set Manually'. This box applies to Water Ballast and Polar degradation (%Clean). When the check box is off, then WinPilot uses data coming from the external flight computer (B50, 302, etc.). When the check box is on, then WinPilot ignores data coming from the external source, and uses data set on this page instead.



14.3 Settings2

Map Direction group box allows selecting the map orientation (North-Up,Track-Up, or Goal-Up).

When the **Auto Advance** option is enabled, then upon detecting a logged gps fix within turnpoint sector (see Rules page), WinPilot automatically advances to steer the pilot towards the next turnpoint of the task.

If the **Auto Zoom** feature is enabled, the map automatically zooms in when the glider is close to the next turnpoint of a declared task (a task has to be selected (`Menu.Flight Plan Task`), and started (`Menu.Start Task`) for that feature to be active).

True North allows switching between True and Magnetic North to be used in navigation.

Auto MC – WP Advanced: if set, then WinPilot will automatically set the MC to the lowest possible setting that allows reaching the goal. If cleared, MC is set manually by touching the Final Glide symbol on the Map. WP PRO: if set, the MC is set externally by B50 (or other). If cleared, MC is set manually as in WP ADV

North Up Circl – sets the map orientation to North-Up when circling

Climb Maxim -WP PRO only – enables or disables Climb Maximizer.

Sim Speed 0 - sets the initial speed of the glider in Simulator to 0. This is especially useful during task meetings, to prevent the simulated glider from flying into restricted airspace and causing noise with sua warnings.

Set GPS Time – if enabled, this makes the Pocket PC time synchronized from the NMEA GPS time. Please make sure that Timezone in your Pocket PC is set correctly (on page Start.Settings.System.Clock).

Arm Start option can be used if Menu.Rules.Start Gate is set to 'Start Line'. When 'Arm Start' is activated, instead of showing 'Start' button on the map, WinPilot's shows 'Arm Start', and Auto Start feature will not operate until 'Arm Start' button is pressed.

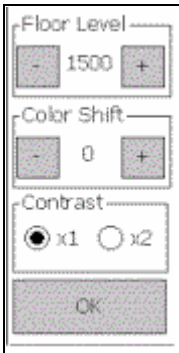
Elevations On – Enables or disables painting elevation contours on the map. Users of older and slower devices should disable this option.

Final Glide – shows Final Glide page, see below.

ElevationsEdit – Allows customisation of the way map colors are assigned to elevations, contrast, etc. See below.

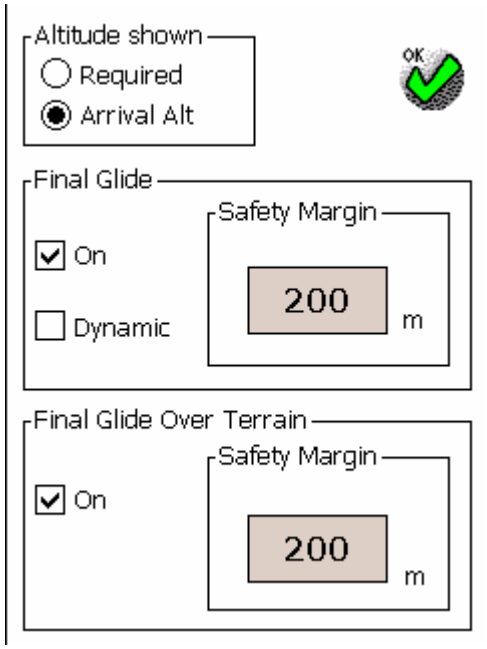
ElevationsEdit adds new ways to control appearance of contour maps. To make it possible to show any mountainous area in colors most suitable for a given pilot, it is possible to 'shift' colors assigned to elevations up or down by a user defined value. Also, it is possible to adjust the lowest shown contour on the map (the 'floor'), so that if a large portion of a flying area is located in a high elevation valley, it is possible to make the valley not be colored at all (therefore providing maximum possible contrast), and have only the surrounding mountains be painted in color. It is

also possible to define how fast the colors assigned to elevations change (Contrast: x1, Contrast: x2). Contrast: x2 is especially useful for displaying contours on monochrome devices. The new map customizer is located at Menu.Settings2.Elevations.Edit. Examples:

<table>
<tr><td> 
</td><td>
</td><td>
</td></tr>
<tr><td colspan="2">Menu.Map.Elevations.Edit</td><td>No color shift</td><td>Color shift: +2</td></tr>
<tr><td>
</td><td>
</td><td>
</td><td>
</td></tr>
<tr><td>Contrast: x1</td><td>Contrast: x2</td><td>Floor: 0m</td><td>Floor: 1600m</td></tr>
</table>

14.4 Final Glide

Final Glide page is accessible either from Settings2 page, or from the main menu (it has to be enabled to be visible on the main menu using Menu.Edit).



Altitude shown – both map and Final Glide computer can either show **Altitude Required** (**altitude msl needed to reach a goal**), or **Arrival Altitude** (**how high will you be when you get there**).

Final Glide Box:
On - turns final glide indicator on map page **On** or **Off** .
Dynamic - (WP PRO only) Dynamic Final Glide. If enabled, WinPilot factors in the extra altitude that can be gained/lost from the difference between current speed and speed to fly for current MC setting.
Safety Margin - safety buffer used in computing final glide. Altitude Required to reach a goal is the sum of the Glide Altitude needed to fly from the current position to the goal, Goal Elevation from the turnpoint file, and the Goal Height selected here.

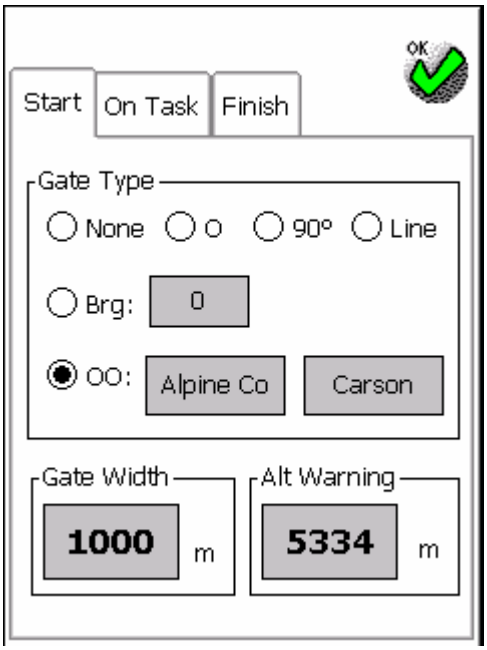
Final Glide Over Terrain Box:
(See chapter Final Glide Over Terrain for more details).
On - turns ground clearance check **On** or **Off** .
Safety Margin - safety buffer used in computing final glide over terrain.

14.5 Rules Page

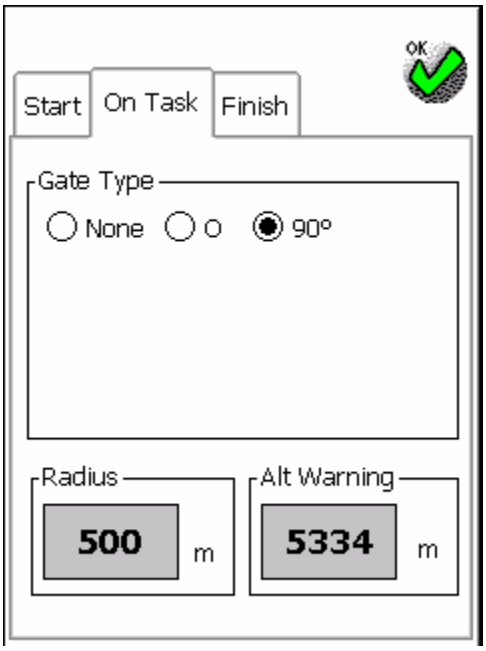
Rules page controls the shape and dimension of the Start Gate, Finish Gate, and Turnpoint sector or cylinder, as well as altitude warnings before and after starting a task.

There are three tabs at the top of the page: 'Start', 'On Task', and 'Finish'.

Rules.Start controls the shape and dimensions of the Start Gate, and altitude warnings before starting a task.
The choices available for Start Gate are:
None – no gate at all
O – Cylinder-type start gate (enter radius into Gate Width)
90° - FAI 90 degrees sector
Line – Start Line perpendicular to first leg of the task
Brg - Start Line positioned at a fixed bearing
OO – Start gate comprised of two cylinders. Waypoints that specify the centers of cylinders are entered by pressing the two buttons next to 'OO:' ('Alpine Co' and 'Carson' in the picture on the right).If this type of start gate is selected, the first waypoint of a task should be set to one of the two start waypoints. For more details see: 11.2 Competition Flight: Using Double-Cylinder Start Gate
The **Gate Width** edit box allows specifying the size of the sector or cylinder. This page also allows specifying **Start Gate** type and width (in the lower group box). The following start gate types are supported: FAI 90° observation zone, start line, cylindrical gate (beer can), or arc-shaped gate(see below). For flying FAI badges and tasks, use 1000m start line, FAI zone, or release point (select None here). Recently a support for autostart the task upon crossing the start line has been added to WP Adv and Pro.
When Menu.Rules.Start Gate Type is set to Start Line, WinPilot automatically starts the task when start line is crossed. Now, when WinPilot detects that the glider came back behind the start line, the task is automatically restarted.



Rules.On Task controls the shape and dimensions of the Start Gate, and altitude warnings before starting a task.

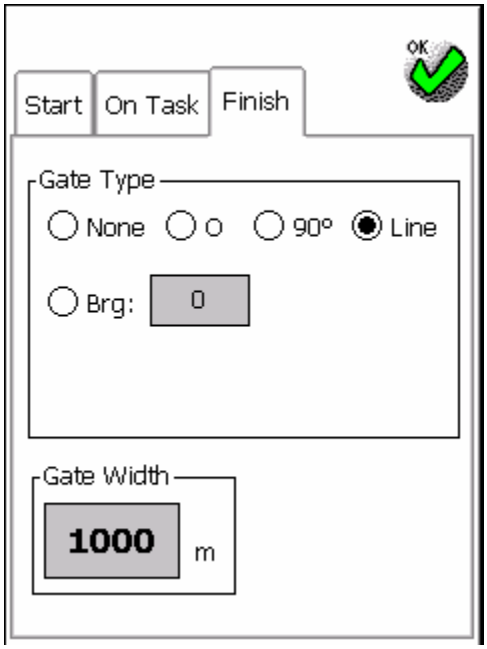


The choices available for Start Gate are:
None – no gate at all

By selecting an **Angle** of 90° in the **Gate Type control** group, the user can enable standard FAI sector shape, or by selecting O he can enable cylinder-type turnpoint control zone type.. The **Gate Width** edit box allows specifying the size of the sector or cylinder.

This page also allows specifying **Start Gate** type and width (in the lower group box). The following start gate types are supported: FAI 90° observation zone, start line, cylindrical gate (beer can), or arc-shaped gate(see below). For flying FAI badges and tasks, use 1000m start line, FAI zone, or release point (select None here). Recently a support for autostart the task upon crossing the start line has been added to WP Adv and Pro.

Rules.Finish controls the shape and dimensions of the Finish Gate. The choices are:
None – No finish gate at all
O – Cylinder finish gate. Note that if this gate is selected, WinPilot decreases the task length by the radius of the cylinder, and computes the final glide to the **edge** of the cylinder, and NOT to its center.
90° - standard FAI sector shape
Line – Line perpendicular to the direction of the last leg.



The **Gate Width** edit box allows specifying the radius of the cylinder (if **O** is selected) or width of the gate (if **Line** is selected).

14.6 Labels page

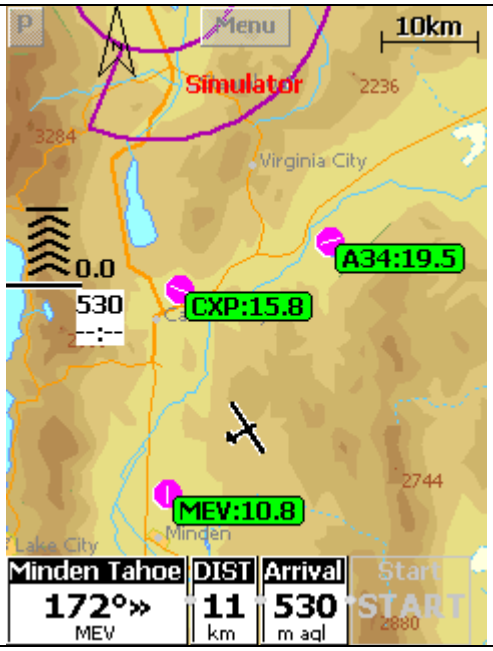
This page controls what text is shown on the map next to a waypoint.

Show Green - if an airport or landing site can be reached from the current altitude and position, then that point can be marked either with a green label, or green background circle.

Label Text – controls whether a waypoint's name, or its ID should be shown on the map. Max Length controls how many letters of the name or ID can be shown on the map.

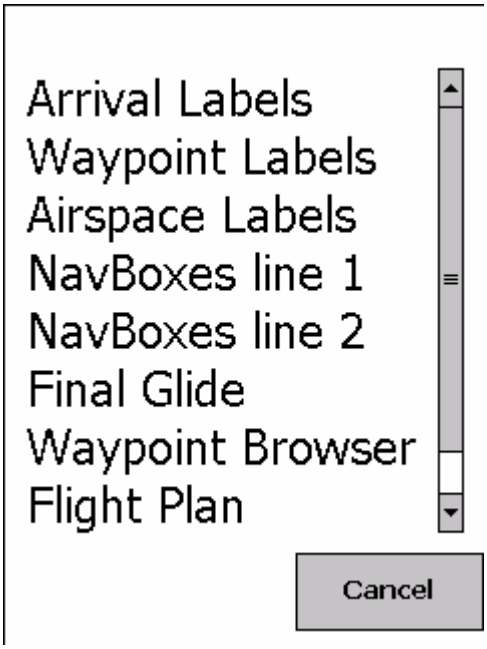
Label Activation – 2 Clicks means that a double-click is required to activate a turnpoint or airspace label on the map, 1 Click means that one click is enough.

L/D Option to display required L/D on the map instead of arrival labels with altitude. This can be selected on Menu.Labels.Show.L/D Required



14.7 Fonts

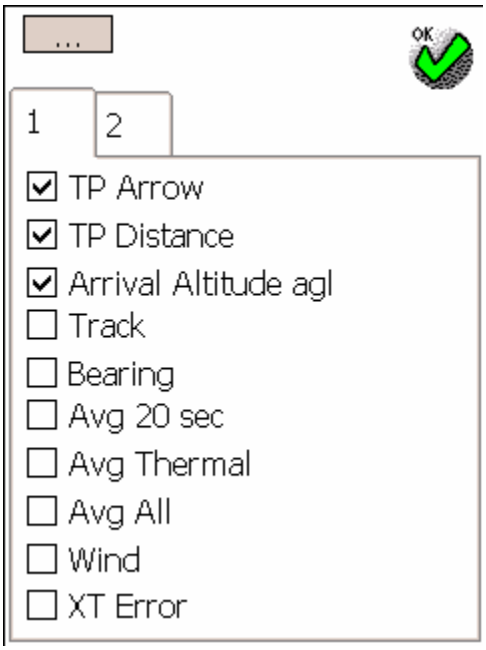
This page allows selecting fonts used in various elements of the program.



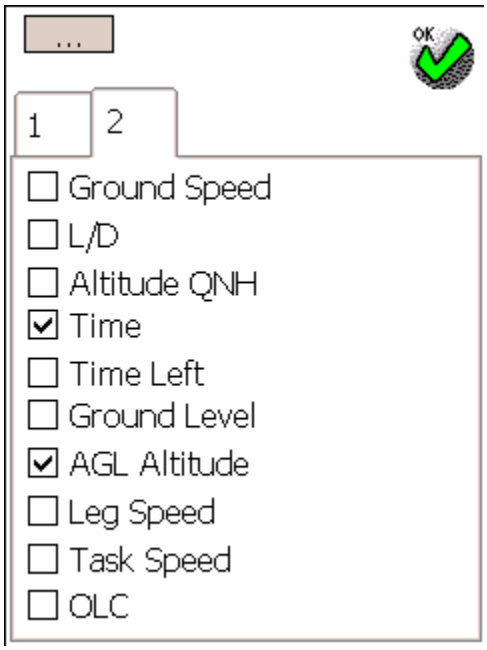
Adding MORE FONTS to your Pocket PC:
Please note that it is possible to install any True Type font that you have on your Desktop PC to your Pocket PC. To do that, use Active Sync to create directory called **\Windows\Fonts** on your Pocket PC, and place the *.ttf font file there. For a list of font files on your PC, search your C: drive for *.ttf files. Run Charmap.exe application on your PC to see how does a given font look like.
For example, to install Arial font, locate file Arial.ttf on your C: drive, and copy it to \Windows\Fonts directory on your Pocket PC. Then, when you start WinPilot and go to Menu.Fonts, Arial should be on the list of available fonts.

14.8 NAV Boxes

This page allows selection of NAV boxes to be displayed at the bottom of the MAP screen.



TP Arrow shows in what direction and how many degrees should the plane turn to fly to the next waypoint.**TP Distance** shows distance to the next waypoint, Gr Speed ground speed, **XT Error** shows cross-track error (how much off track the plane is), **Time** shows the Pocket PC local time (can be synchronized with the GPS time if Menu.Map2.Set GPS time is set), **Ground Level** shows the approximate ground level at the current position (based on Digital Elevation Model data), **Alt AGL** shows the approximate altitude above ground at the current position, **Time Left** shows the remaining time of task (if task time is set on the MCCready.TTime page), **Avg Thermal** shows average lift in the current thermal, **Avg All** shows average lift of all thermals (can be reset via Menu.Stats.Reset Stats.Thermals). **Start/Next Wpt** button is a movable Navbox . **Team Grid coordinate** can now displayed in a Navbox .

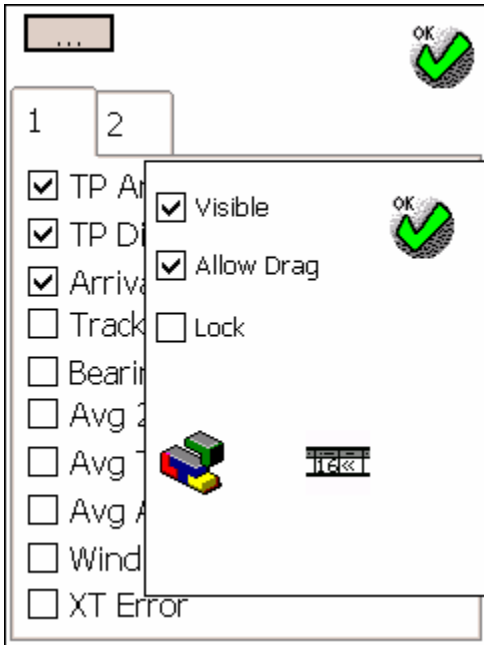


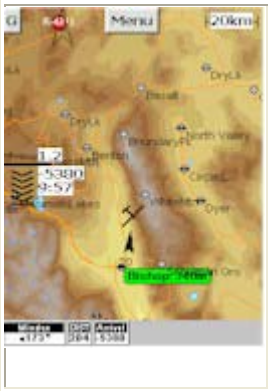
By pressing the **'...'** button it is possible to do the following (see the bottom picture on the right):

a. Turn all Navboxes On or Off - checkbox '**Visible**'.
b. Enable or disable dragging - checkbox '**Allow Drag**'
c. Once all Navboxes are in their desired places pilot can select '**Lock**' to lock them in place.
d. Auto arrange all Navboxes at the bottom of the screen without changing their style:

e. Auto arrange all Navboxes at the bottom of the screen resetting their style:

f. To set some order in the unruly world of movable NavBoxes, a mechanism of connecting one Navbox to another has been introduced. It is now possible to create chains of NavBoxes. The entire chain can be moved when first box in the chain is moved. Chains can be vertical or horizontal (see below). In a horizontal chain the NavBoxes are kept neatly together even when their individual sizes change. When NavBoxes are part of a chain, a small grey circle is displayed between them symbolizing the connection. ArmStart/Start Navbox button is now being painted even when inactive. This makes it easier to find it, and position it on the map. When inactive, the Start button/Navbox is painted in gray transparent color. Pilots who don't want to see the 'Start' button on the map can disable it on Menu.NavBox page.



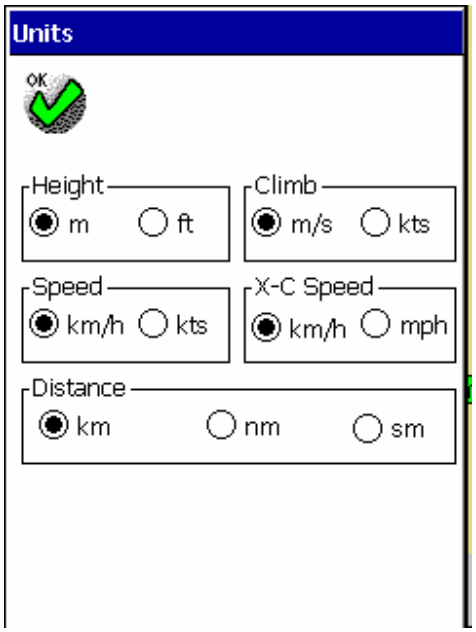


Small NavBoxes, third line disabled

Big NavBoxes, third line (units) visible

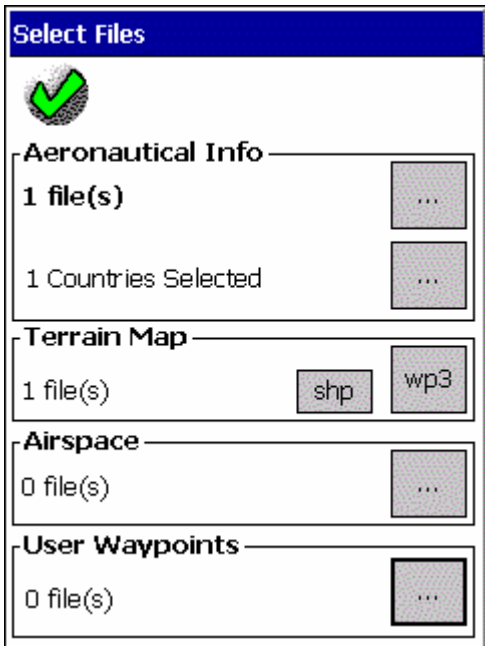
14.9 Units

The Units page allows specifying units for Height, Climb, Speed, Cross-country speed, and Distance.

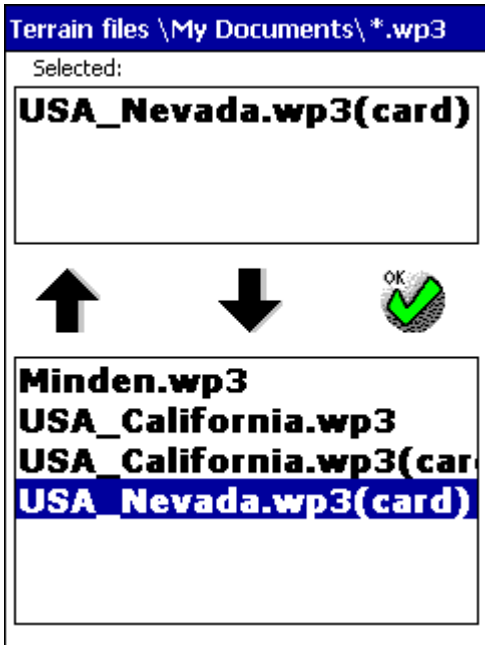


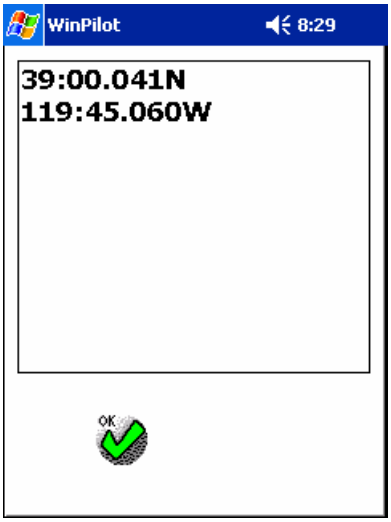
14.10 Files

The Files dialog allows an easy selection of: Aeronautical database (*.wa1) and country from a list available in that database, Terrain Map (extension *.wp3), Airspace description file (in OpenAir format, extension *.txt), and User Waypoints (see Appendix for format description).



Maps, Aviation Database, Thermal Database and other files used by WinPilot can be stored on a Compact Flash or SD card. Menu.Files in addition to files in '\My Documents' also includes files found on storage cards (including internal non-volatile store) found on a device. Files found on storage cards have word '**(card)**' appended to their name (see below).

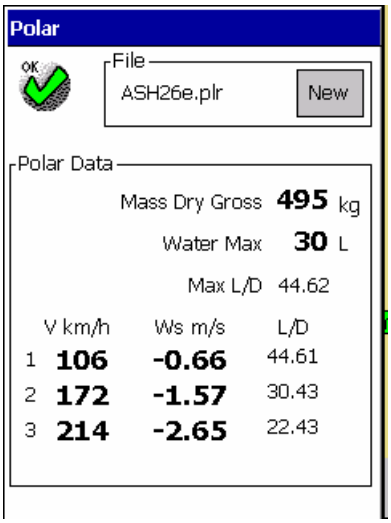




14.12 Position

This page shows the current Latitude and Longitude of the glider. This information can be useful in case of a land-out. The Position page is not active by default. It can be added to the Menu using Menu.Edit.

14.11 Polar



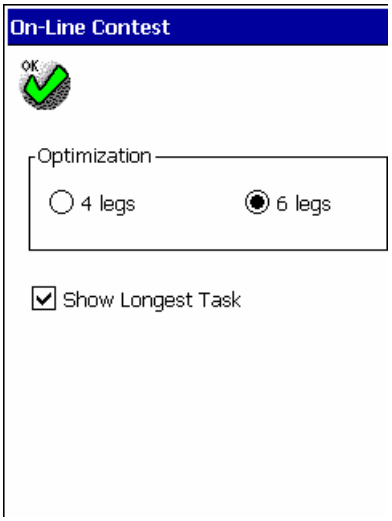
This page allows reviewing polar curve currently being used. The data is taken from file that is displayed in the upper part of the dialog. There is practically an unlimited number of polar files that can be stored on a Pocket PC device. Polar files can be created by the pilot, or downloaded from WinPilot.com web site.

User can switch between polars at any time by touching the '**New**' button. Polar calculation is based on a 3 point polar approximation described in details in Reichmann's book [1].
1, **2**, and **3** - user selectable points on glider's polar (program automatically calculates L/D for each point).

Mass Dry Gross - mass of glider with pilot, but without water ballast in kg.
Water Max – capacity of the water ballast tanks in liters.

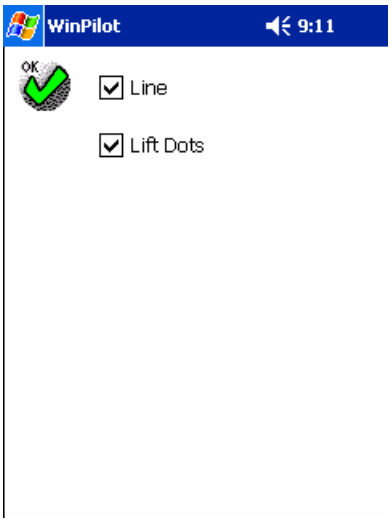
1Cross-Country Soaring, 7th Edition, Helmut Reichmann, Published by the SSA.

14.13 On-Line Contest (OLC)

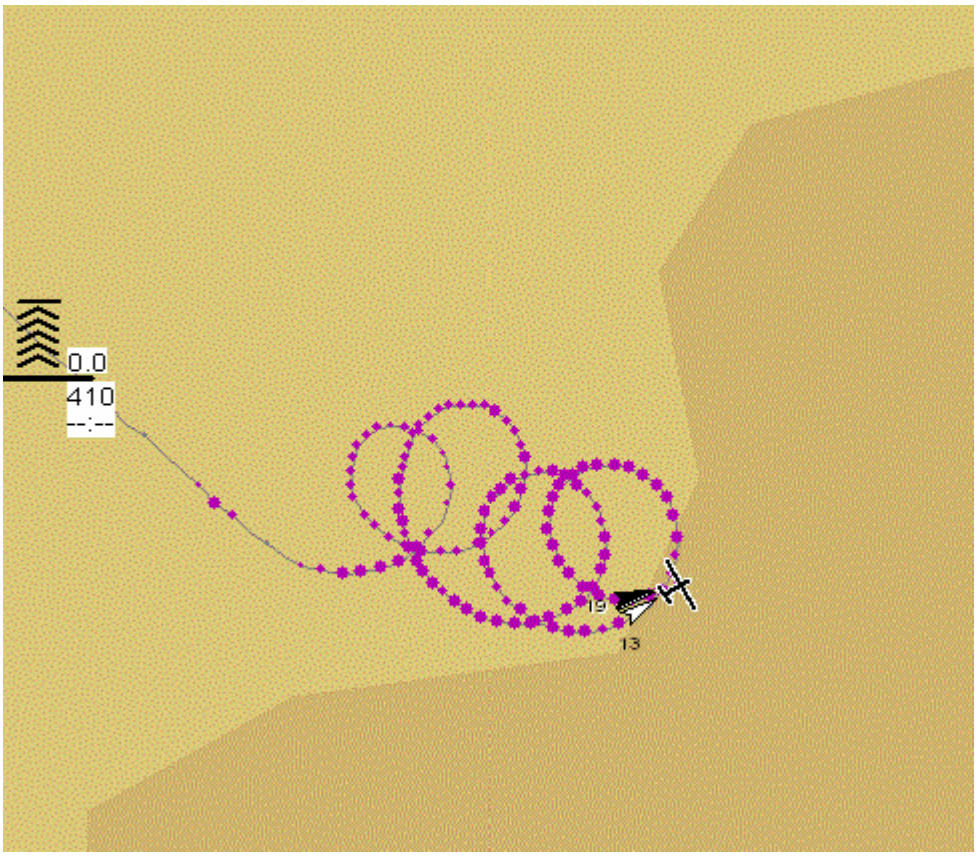


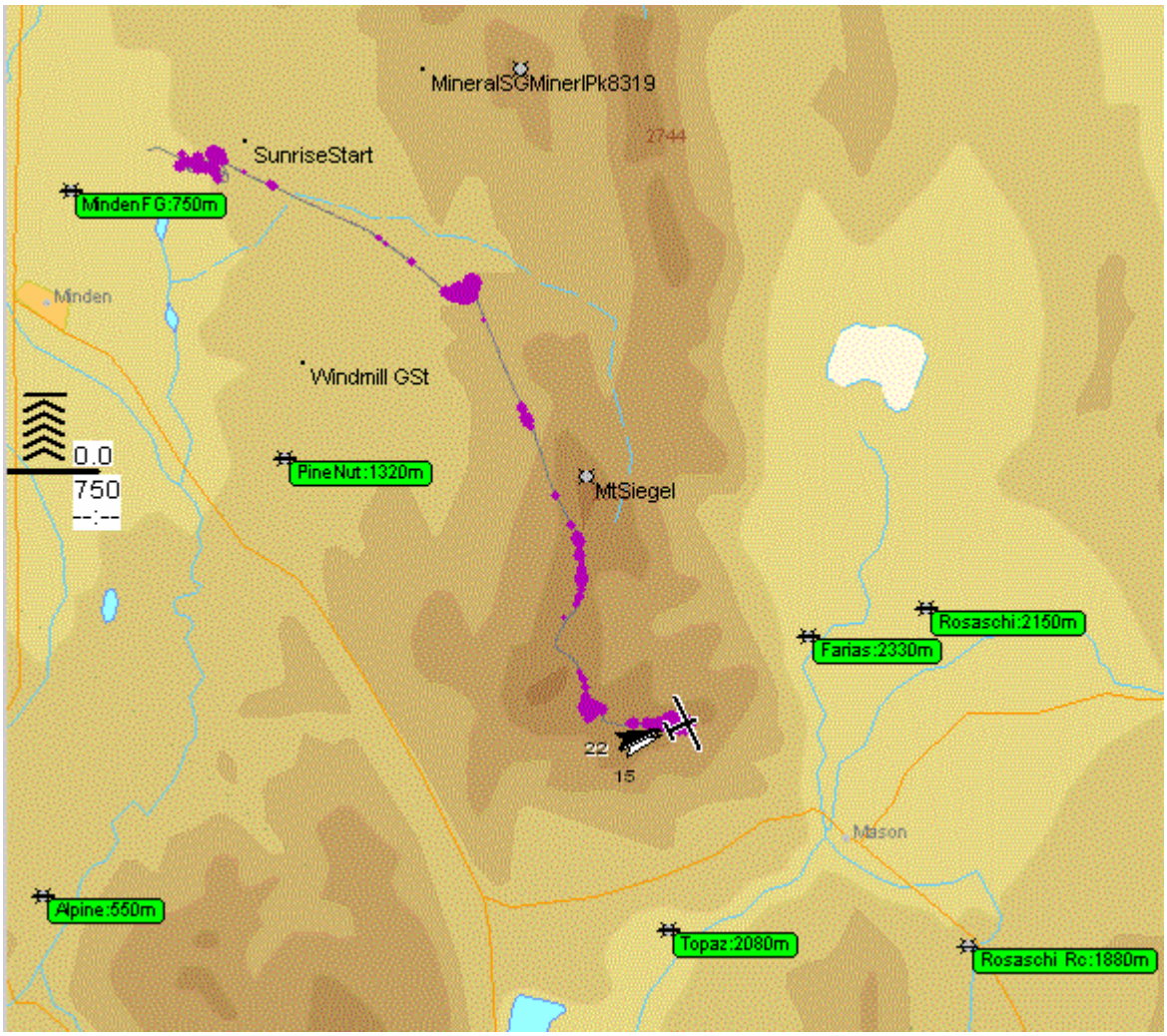
WinPilot can help making tactical decision during a flight in regards to optimizing the flight to maximize points awarded in the OLC contest. There is a special NavBox: called **OLC**. When it is enabled, WinPilot calculates the longest task comprised of gps-fixes flown so far, and additionally, a point that WinPilot currently is navigating to.
Pilot can select either 4-, or 6- leg OLC task optimization. This selection can be made on a menu page titled **OLC**. That page can be enabled via Menu.Edit. For 6-legged optimization, distances on leg 5 and 6 are devalued according to OLC 2003 rules, and the devalued distance is shown in the OLC NavBox..
When '**Show Longest Task**' is enabled, the longest task that can be constructed from the existing gps fixes and finish point is shown on the map with a thick red line. It this check box is disabled, the longest task is not shown, but the pilot can still check the OLC distance in OLC NavBox.

14.14 Trace



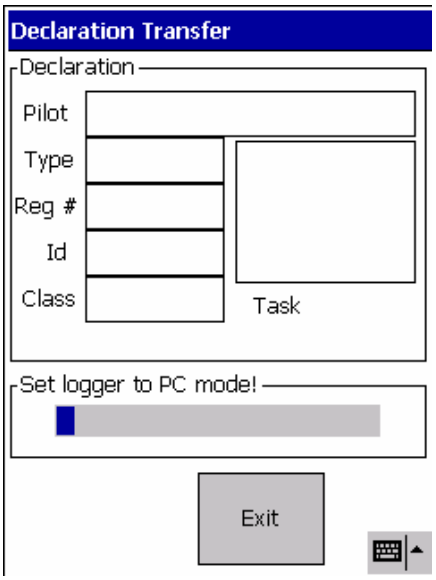
In WP ADV, it is possible to view in flight the trace of the entire flight. In WP PRO, additionally, it is now possible to see the history of lift and sink behind the glider - climb/sink values are depicted using circles. Magenta is used for lift, and dark grey for sink. The strength of lift or sink corresponds to the radius of the corresponding lift or sink circle. The stronger the lift or sink, the larger the circle.
The trace options can be accessed by a new menu button 'Trace'.


0.0
410
--:--
19
13



14.15 Sending electronic declaration to your logger

WinPilot allows sending task electronically to several logger types. Here are the applicable Menu pages:
VL Decl – Sends declaration to Volkslogger,
LX Decl - Sends declaration to Filser/LX series of instruments (LX20, Colibri, LX5000, etc.) and Posigraph.
To 302 - Sends declaration to Cambridge 302
Here are the steps:
1. Enable declaration button for your logger (see above) into WinPilot Menu, by pressing Menu.Edit, touching a menu button, and then selecting the button from pull-down list.
2. Set a task in WinPilot using Menu.Waypoints and Menu.Flight Plan
3. Connect to your logger, and press the declaration button created in step 1.
4. WinPilot should download the existing declaration, and show a button '<->00' allowing replacing task read from the logger with Task 00 currently defined in WinPilot.
5. Use pop-up keyboard in the lower right corner to modify pilot's name, or other text fields.
6. Press **Send** to send the Declaration to your logger.
LX Decl and **To 302** operate in Simulator Mode only.

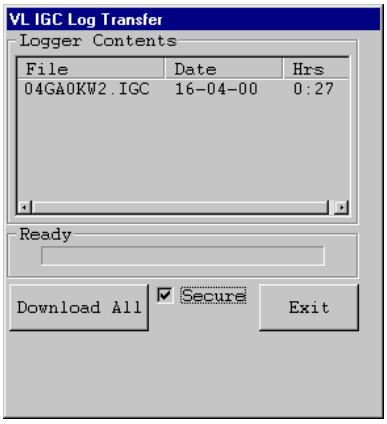


14.16 Transfer of IGC flight logs

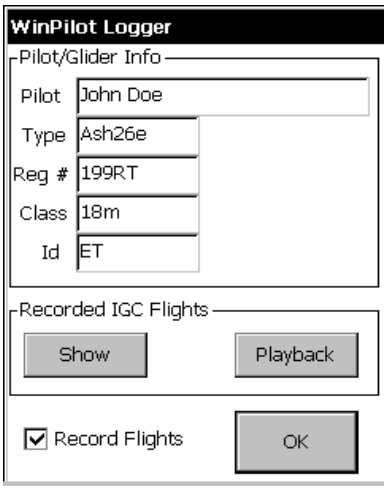
The **VL Logs** page allows transferring IGC flight logs from Volkslogger to the Pocket PC device (logs are then available in the `\My Documents\Logger_IGC_Files` directory).

The 'Secure' check box allows selecting between the fast download mode (without security key), and secure mode with security key. Although a file transferred in Secure mode is identical to one downloaded using the `data-gcs.exe` DOS application, the latter is still the only transfer method officially approved by the IGC.

After the logs are downloaded, this page also allows clearing all flights from Volkslogger's memory



14.17 WinPilot as a Flight Recorder



The **Menu.Logger** page allows enabling flight recorder functionality of WinPilot.

WinPilot generated logs can not be used for Badges, Records, and other tasks requiring IGC-approved loggers.

For flight analysis alone, WinPilot generated logs are now perhaps the most detailed in the industry (1-sec fix rate, all flight parameters recorded).

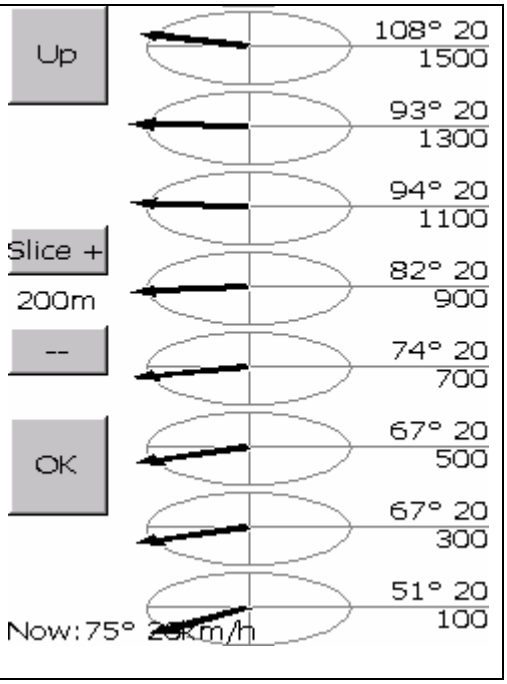
Pilot/Glider Info contains data that will be included in the WinPilot-created IGC file (along with the currently selected task).

This page also allows reviewing IGC files (created either by WinPilot or a logger) in the **Show** mode (whole flight shown t once), or **Playback** mode (one fix at a time – reply of what the pilot saw in the cockpit during the flight). Flight playback with all flight parameters is available only for WinPilot created IGC-files.

Warning: If Flight Recording is enabled, the flights need to be occasionally transferred to a PC, or deleted, or your Pocket PC's memory will be completely filled.

14.18 3D Wind

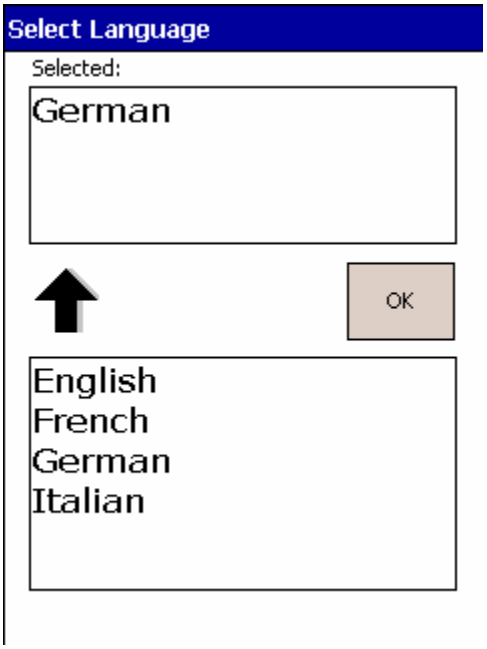
This page shows wind direction and speed at different altitudes, and therefore helps adjusting the optimal working band for a given leg in flying cross-country. By default wind speed and direction are shown in 200 meters intervals, but this can be changed using the Slice+ and Slice – buttons.

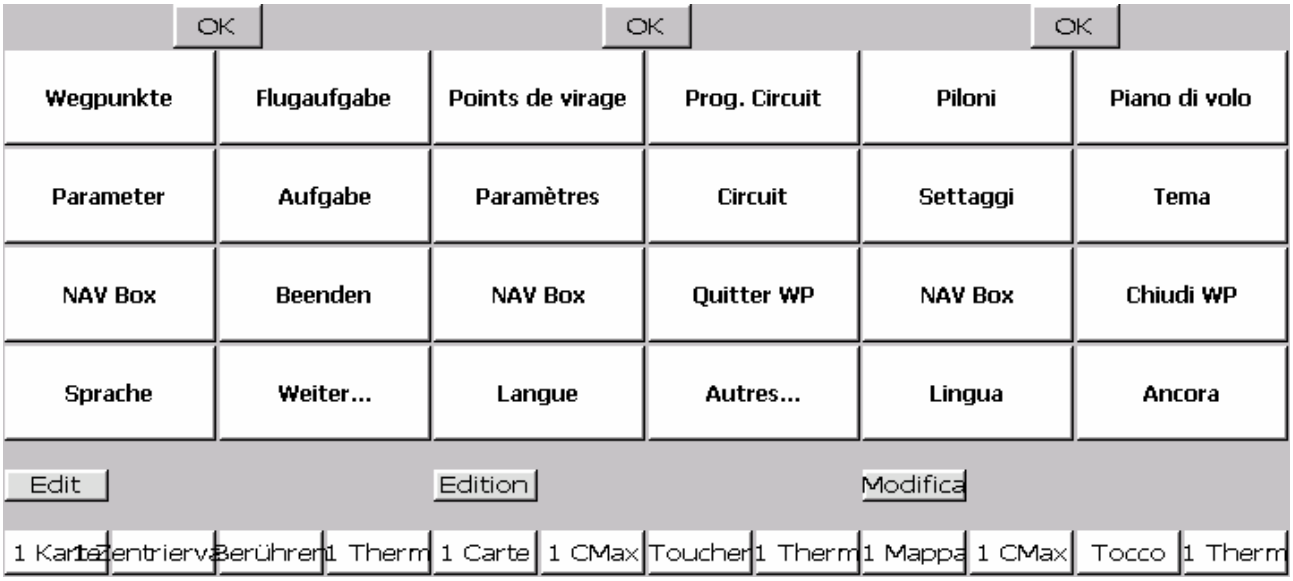


14.19 Language (German, French, Italian, and more)

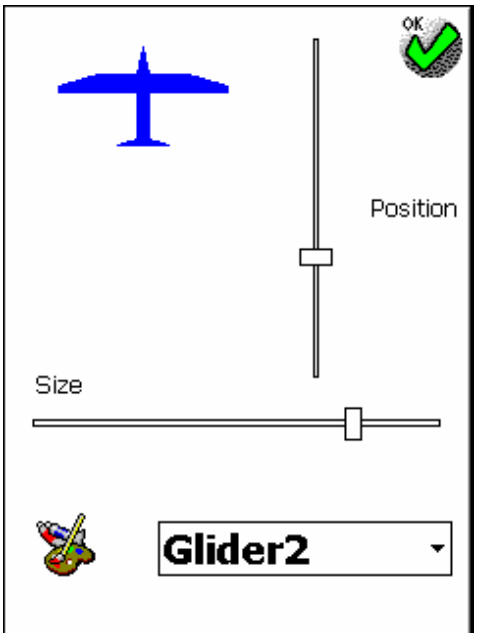
Starting with version 5.0, WinPilot allows selecting language other than English to display information. Strings in other languages are located in file WP_TEXT.xml, and can be modified by the user. Currently the following features of WinPilot have been translated: Menus, NavBoxes, and NavBox selection page.
File WP_TEXT.xml is a text file, and can be extended to include other languages.

.





14.20 Symbols



'**Symbols**' page can be used to adjust Size, Colour, and Position of map symbols like Glider, and Final Glide indicator.
This page is accessible via Menu.Map, or by selecting button '**Symbols**' into main menu.

Slider '**Size**' changes size of a selected symbol.
Slider '**Position**' moves glider on the map towards the top or the bottom of the screen.

changes colour of a symbol..

14.21 Map

'Map' page controls what should be shown on the map.
Airport and Airspace options control data from WinPilot Airdata file (extension *.wa1).

User Waypoints and User Airspace control OpenAir airspace and user waypoints (extension *.dat).

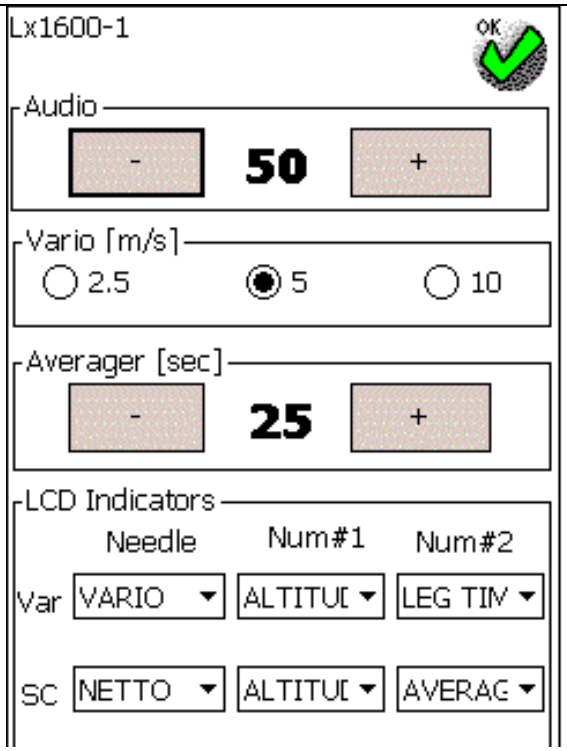
'Symbols' invokes 'Symbols' page (see above).

14.22 LX1600

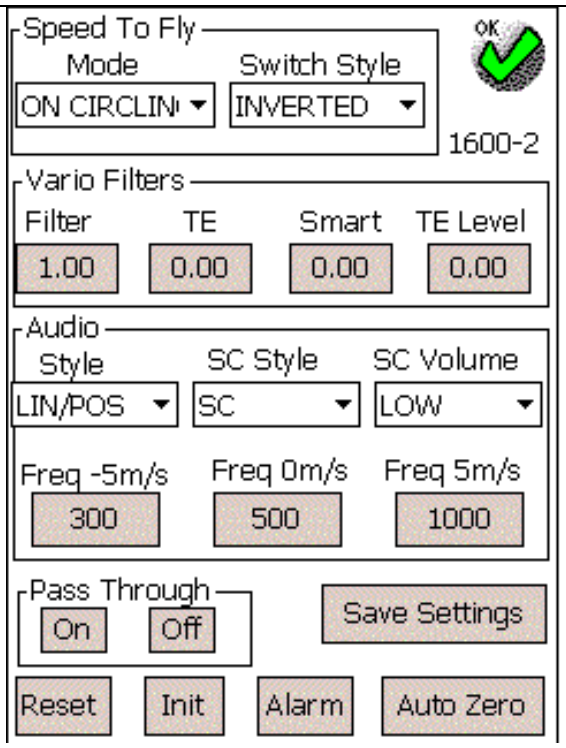
There are two new menu pages that can be enabled via Menu.Edit: LX 1600-1 (below on the left), and LX1600-2 (below on the right). First page allows setting Audio volume, Vario range, Vario Averager, and LCD indicators. Second page allows setting all other parameters of the LX1600. Please refer to LX1600 documentation for more details. Additionally, the following values are now transmitted between LX1600 and WinPilot PRO: McCready Settings, Water Ballast, Bugs, and Polar data.

This dialog only appears when WinPilot PRO is connected to the LX 1600 variometer. For more information on LX 1600, visit www.lxnavigation.si LX 1600 is a simple variometer with only a few knobs.

Audio allows you to control the volume of the LX1600.
Vario allows you to control the properties of the variometer needle scale
Averager selects the averager time.
Needle lets you setup what the needle on the indicator shows (Vario, Speed Command, Netto vario or Relative vario)
Num#1 lets you setup what the bottom number on the display shows (Altitude QNH, Distance to target, Glide slope difference, Indicated airspeed or Leg speed)
Num#2 lets you setup what the upper number on the display shows (Average vario, Current time, Flight time or leg time)
Speed to fly panel



Mode selects when the vario sound changes from vario to speed to fly.
Switch Style when set to External it will use the information from an external switch which you must have installed somewhere in the cockpit.
In the On circling mode it will change to vario when the glider is circling while it will be in Speed to fly mode while cruising. Auto speed mode will switch to speed to fly mode when the airspeed becomes greater than the Spd. value on this same panel.
Switch style allows you to "invert" the switch operation through the software. Taster option will change the modes each time the taster is pressed.
TAB allows you to select how deep the silent are is (this is an area around zero where speed to fly indication will not beep).
Vario Filters affects sensitivity of the vario. The higher the number, the slower vario needle and audio signal respond. Default = 1 sec
TE Filter selects the filter for Total Energy. The higher the number, the longer it takes for the vario to show the change in Total energy altitude of the glider. .1 to 2.0 seconds, default is 1.5
Smart filter is a dynamic filter and controls the rate at which the vario indication moves. Higher number is slower, more filtered. (see LX1600 documentation for more on this)
TE Level allows you to compensate for inaccuracies in static pressure/TE tubes. See the LX 1600 manual (chapter 3.2 - Pneumatic Connection) about how to connect the tubes in order to have electronic compensation (it is different than the tubing when connected to TE pressure compensation). If using a TE Probe Set to 0. No adjustment is possible. If using electronic TE then see the LX1600 manual for setup. 100% is default for Electronic TE Compensation.
Audio panel is at the second settings page - LX1600(2).
Style lets you choose between the following types of variometer sounds:
Lin/neg = The sound changes in linear correlation to the vario reading. It is intermittent at negative vario values.
Lin/pos = The sound changes in linear correlation to the vario reading. It is intermittent at positivevario values. This is the default setting.
Linear = The sound changes in linear correlation to the



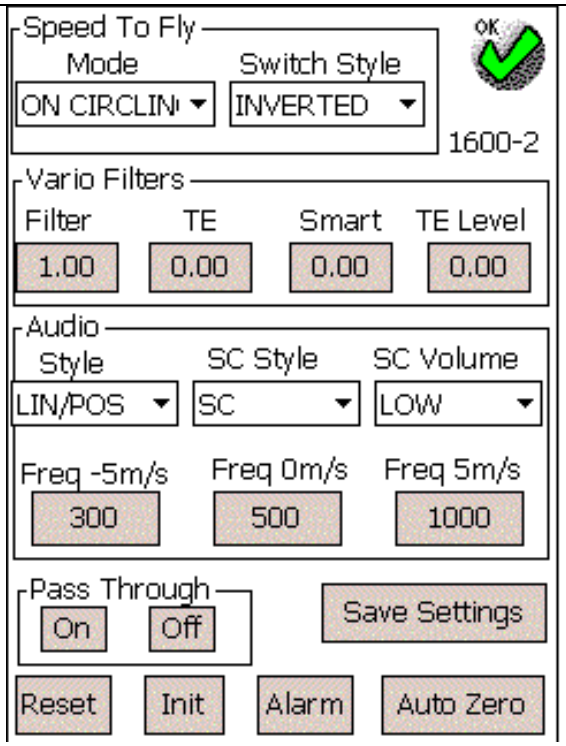
vario reading. It is not intermittent.
Dig/neg = The sound changes in discrete steps. It is intermittent at negative vario values.
Dig/pos = The sound changes in discrete steps for each X.Xm/s. It is intermittent at positive vario values.
Digital = The sound changes in discrete steps for each X.Xm/s. It is not intermittent at any vario values.
SC Style lets you select between SC pos, SC neg and SC. SC pos beeps at positive values, SC neg beeps at negative values wile SC gives a continous sound at positive values, so you won't mistaken its beeps with vario sounds.
SC Vol allows you to select between noisy (Vol H) and more silent sound (Vol L) in Speed command
Freq-5m/s is the sound you will hear when the vario is pegged at -5m/s.
Zero freq is the sound you will hear when vario equals zero.
Freq 10m/s is the sound you will hear when the vario is pegged at +10m/s
. Test button allows you to see and hear what you have setup. You must be positively connected to LX 1600 in order to test its audio settings.
LCD indicator is found on the second settings page - LX1600(2). It allows you to setup the upper and lower numbers in the LCD separately for vario and speed command modes.
Pass Through allow a WinPilot Declaration to a GPS Logger
Task Declaration
Here are the steps:

1. In WinPilot Simulator, go into Menu.About.License Type Change and select Initialize.LX1600.
2. Go into Menu.Edit and enable menu pages LX1600-1, and LX1600-2
3. Exit Simulator, start WinPilot in GPS mode and connect to your LX16000/logger combination.

Task Declaration:

1. Pass through On

2. Declare task by assigning a button LX Declare.

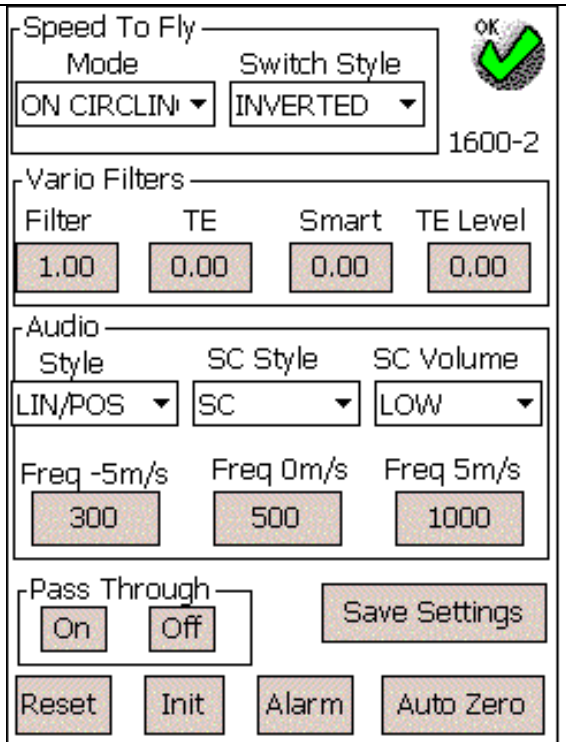


3. Active a task, touch LX Declare button.

4. Go back to the LX1600-2 page and turn Pass Through Off.

Save Settings Write settings to eeprom will save your current settings from both pages (LX 1600 and LX1600-2)
to LX 1600, so they are used even if the PDA is not connected to LX 1600, which can happen in case of power failure of the PDA

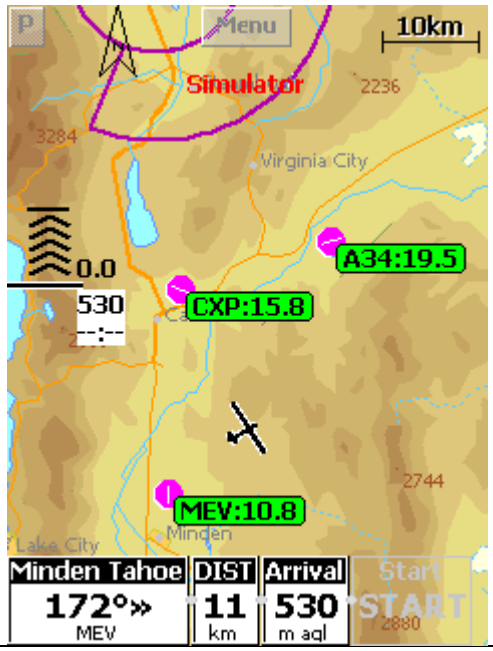
Reset resets default values.
Init
Autozero is used when you notice that the needle is not exactly zero on the ground when nothing
is moving and the wind is calm. Press autozero in a calm environment to re-calibrate vario
parameters to zero.



.
37
64
.

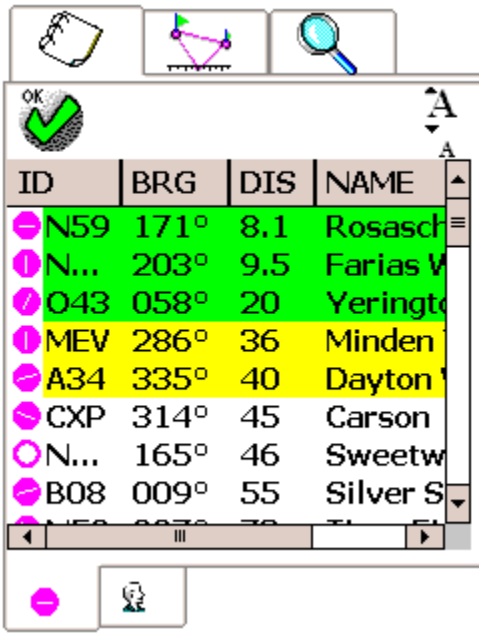
14.23 Display required L/D on the map instead of arrival labels with altitude.

This can be selected on **Menu.Labels.Show.L/D Required.** The L/D calculation includes the pilot set safety altitude.



14.24 GoTo page.

Airports within reach at the current McCready have green background. Airports that can be reached with a lower McCready setting are shown in yellow. The new GoTo page can be selected into the Menu using Menu.Edit.



14.25 Run

RUN allows starting other programs from within WinPilot. Steps:

1. Goto Menu.Edit, and select RUN onto one of the buttons.
2. In the 'Button Text' field enter the FULL PATH to the application you want to run, for example:

\Windows\calc.exe

Note 1: The path is CASE SENSITIVE, that is, Calc.exe is DIFFERENT than calc.exe.

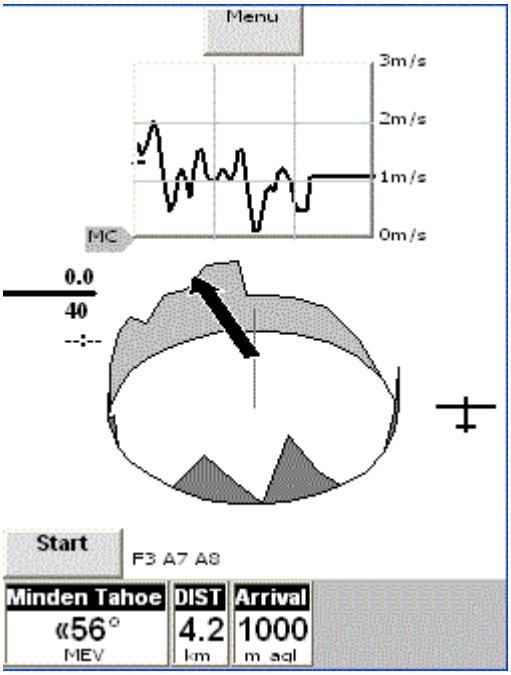
Note 2. The application should have a way to exit it, otherwise it could be difficult to get back to get back to WinPilot (other than invoking WinPilot from the Start Menu).

15 Climb Maximizer (WinPilot PRO only)

Climb Maximizer is a feature of WinPilot PRO that helps locate the area of best lift in a thermal.
When circling, WinPilot analyzes Variometer data, and signals via audio tone, and visual depiction,where the glider should move to take advantage of the best possible lift in a thermal (to maximize the average climb rate).

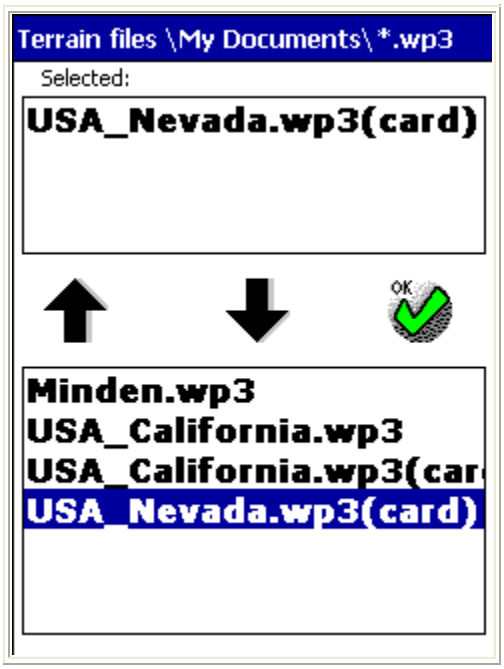
How to use it:
Audio: when the glider reaches a heading where it should fly straight to reach the center of the thermal, WinPilot palys a short sound. When the pilot hears that sound, he should roll-out briefly, and then continue to circle.

Visual: The glider needs to be rolled out about 20 to 40 degrees before the black arrow reaches a position where it points directly up. Then, the glider needs to fly straight for a distance proportional to the length of the arrow. The shorter the arrow, the closer to the center of the thermal the glider is. If the glider is in the center of the thermal, the arrow turns into a small black circle, and no corrections are needed.



A graph at the top of the page shows the history of average lift in a given thermal. The small arrows at the left of that graph show the average of this thermal, the average of all thermals on a given day, and a McCready setting.

Navboxes are now not being displayed on Climb Maximizer screen. To see NavBoxes while Climb Maximizer is active, pilot needs to press the '1 Cmax' button to temporarily get to the map screen.



16 Team Flying

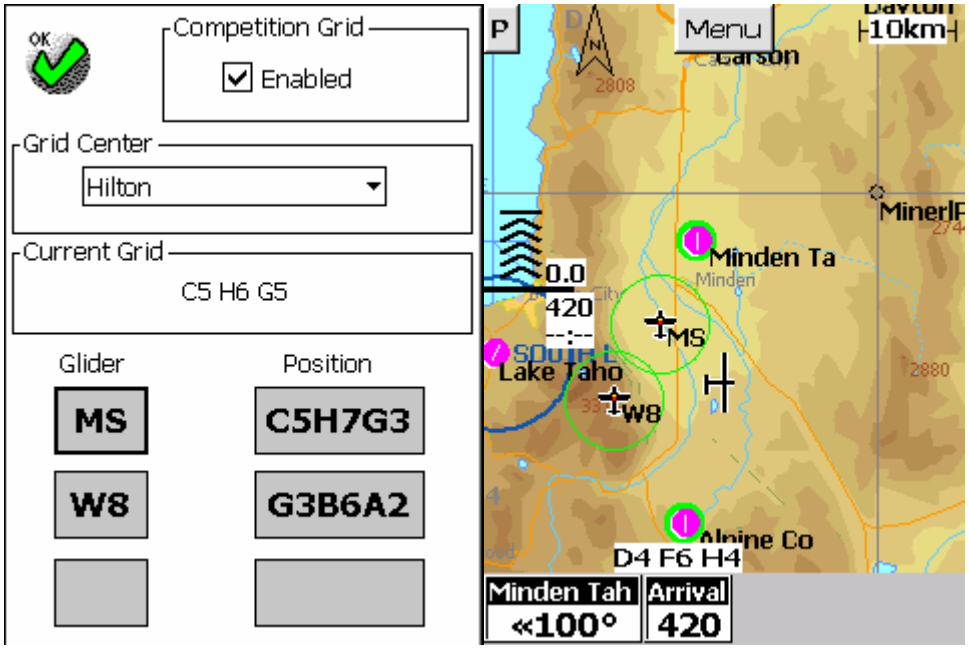
To keep track of where other team members are, (or to mark on the map positions of thermals reported by them), the **Team** feature of WinPilot can be used. It can be enabled via Menu.Edit, and selecting **Team** into one of the Menu buttons. Team Grid coordinate can be displayed in a Navbox.
This page allows tracking up to three other gliders. Positions of these gliders can be entered in Grid coordinates, which are communicated via radio between gliders, or between ground station and gliders.
Grid coordinates are dependent on the center of the grid which can be set on the **Team** page. Grid center must be one of user waypoints. It is useful to set the grid center near the middle of the task planned for a given day.
When the Team feature is enabled, in the lower left corner of the map WinPilot displays the current grid coordinates, which can be communicated to other gliders, or to ground station running WinPilot XP (D4 F6 H4 in the example below on the right).

Team Grid coordinate can be displayed in a Navbox by selecting in the NAV Box Page.

To track other gliders, first enter their competition sign (this can be done in the Simulator mode on the ground).
Then, to enter a position of that glider, press the button next to the competition sign of that glider.
The map will pan to show that glider (click Restore to center the map back on your glider).
The example below shows two gliders being tracked using the Team feature: MS (position C5H7G3), and W8 (position G3B6A2).

To simplify entering of other glider positions, WinPilot provides three menu commands that can be assigned to the front buttons of a Pocket PC. These commands are: '**1 Team**', '**2 Team**', and '**3 Team'.** For example, if on the **Team** page glider 'W8' is set as the second Team glider, then the pilot can assign '**2 Team**' to one of iPAQ's

hardware buttons, and press that button to get directly into the grid keyboard page that allows inputting of that glider's position.



17 Risk Management

WinPilot contains several features that help manage level of risk during a flight.

17.1 Selecting working altitude band

Many pilots have their personal preferences as to how low in relation to cloud base are they willing to go in order to find the best lift. Usually the low limit of altitude band is set in proportion to the cloud base above ground level. Typical value for beginning pilots is 50% of the cloud base agl, where competition pilots usually fly much lower. Other pilots prefer selecting a 'hard deck' at a certain altitude above ground, which they try not to cross, no matter what the cloud base is. In any case, a good helping tool in selecting the lower boundary of the working altitude band is the '**Alt AGL**' Navbox, that displays altitude of the glider above ground level.
As the glider moves over higher or lower terrain, to stay at similar level of risk, the pilot should adjust his working band higher or lower, accordingly.

The upper limit of the working band is usually determined by the following factors:

1. Whether or not the average lift stays strong closer to the cloud base. To help pilots judge this, there is a Navbox '**Avg 20 sec**', that displays the 20 second averager. WinPilot PRO users also have the history of average lift in the current thermal. If the lift gets weaker closer to the cloud base, it usually pays off to lift the thermal before reaching the base.

2. The gradient of wind with altitude. On certain days there is a strong wind speed gradient, that is the wind speed at higher altitudes is very different from speed at lower altitudes. This can be a factor in selecting the upper limit of working altitude band. It might be the case that on some legs of a task it pays off to

stay higher to take advantage of the stronger tail wind, where on other legs it might be advantageous to stay lower, to avoid stronger headwind at higher altitudes. To help pilots create a mental image of what the wind is doing at different altitudes WinPilot contains a 3 dimensional wind display, that shows what is the speed and direction of wind at different altitudes. This 3D wind display page can be shown by touching the wind arrow on the map (next to the glider symbol), or via Menu.3DWind.

3. Special Use Airspace (SUA). There is always some limit on how high the regulations allow the glider to fly. If a flight is performed under a SUA segment, it is up to the pilot to keep appropriate margin from the airspace. WinPilot allows selecting a vertical buffer, above which a SUA warning will be shown on the screen (Menu.User Airsp.Warnings.Configure). Each pilot can set this margin according to the level of risk he is willing to take.

17.2 Selecting McCready value

Pilots flying with WinPilot PRO hove some extra tools at their disposal helping select the proper McCready value. On the Climb Maximizer page, in the upper half, there is a scale showing the average lift in the current thermal, as well as average lift in all thermals on a given day. This value might give a better idea to what value should the McCready be set, to properly estimate average lift expected in the next thermal. If the conditions get worse, or better very fast, it is possible to reset thermal statistics via Menu.Stats.Reset Stats.Thermals.

17.3 Selecting task length

In many cases it is important to understand how much of a flying day is there left, and compare it to the reminding distance of the task. The shorter the day, and the longer the remainder of the task, the greater the risk is. To help pilots manage that risk, WinPilot computes Estimated Arrivel Time at the finish (which is shown below the Chevrons on the map). If the arrival time gets close to the expected end of thermal conditions, it might become necessary to shorten the task.

18 Sample Flights

18.1 Badge or Record flight

Make sure that Menu.Rules.Turnpoint control is set to 90 degrees, and start gate is set to 1000m line.
If this is a triangle record or a diamond attempt, make sure that each leg is within limits of % of the total task (see the % column on the Flight Task page), as specified by the FAI. When you start the task, the Chevrons page will remember your start time and start altitude. Remember that your finish should be within 1000m from that start altitude, or a distance degradation rule specified by the FAI will apply. Starting with version 3.52, WinPilot allows computing final glide start altitude – 1000 meters (see The 'Chevrons' screen (McCready page)), which is the preferable setting for this type of flight.

18.2 Competition Flight: Using Double-Cylinder Start Gate

In many contests, including WGC in Leszno, each day pilots are given an option to select one of two pre-assigned starting points. WinPilot 4.0 makes it easy to fly this type of start procedure. Here are the steps:

1. Go to Menu.Rules and select double cylinder start gate ('**OO'**).

2. On that page select the two starting points for that day by pressing buttons next to the symbol ('**OO'**).

3. Go to Task Editor, and enter the task of the day. Remember to set the first turnpoint of the task to one of the 2 possible start points

4. Before start, WinPilot navigates to the selected waypoint (it's name is shown in the Navbox at the bottom of the screen).

5. WinPilot shows the name of the other starting point on a button in the lower right corner of the map. To quickly replace the currently selected starting point with the other one, pilot has to press the button in the lower right corner of the map. This can be done any number of times.

18.3 Competition Flight – Assigned Task

Make sure that Menu.Rules.Turnpoint control is set to 369 degrees, and the radius is set to what the contest organizers require. At many contest the radius is 500m, or 0.25 mile (400 meters). Set the Rules.Start Gate to the appropriate shape (many contests use start lines or start cylinders). If you go through the start gate, and want to return for another start, use the Chevrons page to reset the task, and have WinPilot guide you back to the start gate. If you have WinPilot PRO, you might want to disable Climb Maximizer before the start, so you have a clear view of the start gate even when circling. With all competition flights it is important not to confuse waypoints given by the organizers with waypoints from the internal WinPilot database file (*.wa1). On the Flight Plan page, remember that the database waypoints are on page, and user's waypoints are on page.

18.4 Competition Flight – Pilot Selected Task

All the comments above apply here too. Additionally, for this type of task it can be important to have the skill of quickly modifying a task in flight. Many pilots find the GoTo page useful for that. When you need to insert a waypoint, but have just have a vague idea of the direction where you want to fly, put your finger on the map and point in that direction. WinPilot will show you turnpoints in that direction. Make sure that you select waypoints from the user list , because airports from the *.wa1 database can have different coordinates than specified by the organizers.
For this type of task, it might be useful to enable 'Task Time' column on the Flight Plan page, so 'what-if' calculations using different waypoints can be performed, and their effect on the planned arrival time at the finish can be seen. It might also be useful to use the Wpt.Move Up and WPT.Move Down options, to arrange the planned remaining waypoints in any desired order.

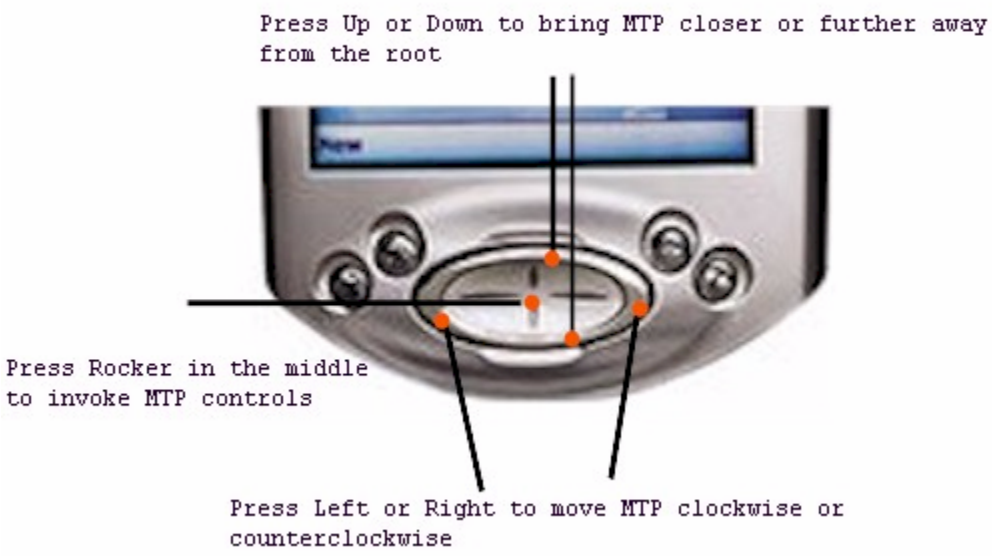
18.5 Competition Flight – Assigned AREA Task

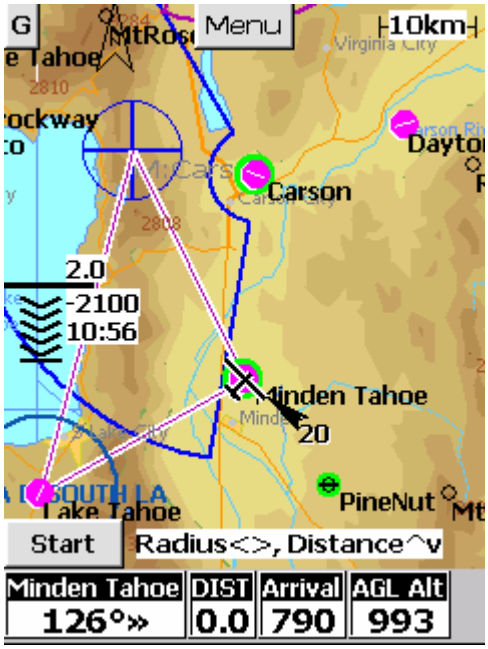
First, set up the assigned areas via Menu.Flight Plan.WPT.Area. WinPilot assigns a mobile turnpoint to each of the areas. Look at the weather forecast, and try to estimate either your cross-country speed on that day, or your average McCready setting. Then, go to Chevrons page, press the button in the left upper corner (MC by default), and select a method WinPilot should use to estimate your arrival time at the finish. For example, if you have an estimate of your average cross-country speed, set ETA Speed to Manual, and enter your estimated speed there. If you would rather enter your estimated McCready setting, switch the ETA speed to MC.
WinPilot will now use that estimated speed to calculate your arrival time at the finish. On the Chevrons page, you might also want to set the AAT task duration, to make WinPilot show you how many hours and minutes do you still have left (as opposed to showing the Estimated Arrival Time).

When you have your speeds and task time set, then it is time to adjust positions of Mobile Turnpoints, so you arrive at the desired time. This can be accomplished by touching and dragging a Mobile Turnpoint while observing the final glide (chevrons) display. For example, you might want to position points in such a way that

the arrival time is just after the minimum task duration time assigned by the contest organizers.
During the flight, you might want to change the assumptions set on the chevrons page, so they closer match the reality. On very long final glides, it might be useful to set the estimated speed to the current ground speed(ETA Speed.Ground).
Please note that the front Rocker switch on a Pocket PC can also be used to move Mobile Turnpoints. Pressing the Rocker switch in the middle switches operation of that switch from Zoom-In and Zoom-Out to moving Mobile Turnpoints. Pressing Up and Down brings Mobile Waypoint closer or further away from the root of an Area, and pressing the left or right rocker key moves the Mobile Turnpoint clockwise or counter clockwise within an Area (see picture below).

Mobile Turnpoint (MTP) control using front Rocker switch:


Press Up or Down to bring MTP closer or further away from the root
Press Rocker in the middle to invoke MTP controls
Press Left or Right to move MTP clockwise or counterclockwise



Picture above: after pressing the Rocker in the middle, the map shows text: '**Radius <>, Distance ^v**', which means that the Rocker now controls the position of the next Mobile Turnpoint.

18.6 Local flight

During a flight when no task is set, WinPilot shows final glide to the Home airport. All other airports/landing sites within gliding range are shown either with a green background, or green label. The safety margin for final glide calculation can be set on Menu.Settings2.Goal Height. That safety margin is added to the elevation of all landing places. In this mode, it is possible to fly in the 'airport hop' mode, that is to advance on only when another airport comes within gliding range.

Appendix A
Format of WinPilot files

A.1. Polar File

Here is a sample polar file (a * at the beginning of a line makes it a comment line):

*LS8 (15m) WinPilot POLAR file: MassDryGross[kg], MaxWaterBallast[liters], Speed1[km/h], Sink1[m/s], Speed2, Sink2, Speed3, Sink3

360, 180, 100,-0.67,155,-1.45,185,-2.5

A.2. User Waypoint file

WinPilot Turnpoint file for a given site should be comprised of entries in the following format:

```
Id, Latitude, Longitude, Elevation, Attribute, Name, Comment *ZNN
```

where:

Id = turnpoint identifier (each turnpoint must have a different Id)

Latitude, **Longitude**: in one of the following formats (`ss`=seconds, `dd` = decimals):

```
dd:mm:ss  (for example: 36:15:20N)
dd:mm.d   (for example: 36:15.3N)
dd:mm.dd  (for example: 36:15.33N)
dd:mm.ddd (for example: 36:15.333N)
```

followed by N,S,E,or W

Elevation – a number that can be followed by the letter '`F`' if the elevation is in feet (if no letter is present it is assumed that elevation is given in meters), for example:

```
,1623F, - elevation is 1623 feet
,1623,  - elevation is 1623 meters
```

Attribute: the following attributes are supported:

A = Airport,

T = Turnpoint,

L = Non-Airport Landing Point

S = Start, F=Finish, (not currently used),

M = Markpoint – a navpoint without an arrival cylinder drawn around it

H = Home (there must be one and only one turnpoint with attribute '`H`' in the `WinPilot.dat` file, it is the default navigation target)

Name: Name of the waypoint, maximum 12 characters long

Comment: Additional description, maximum 12 characters long, shown at the bottom of the TP Arrow Nav Box, and on the pop-up waypoint labels.

***ZNN** (optional) - NN denotes Zoom level at which a given turnpoint should become visible, for example:

```
16,39:00.000N,119:45.200W,4718F,ATH,Minden ,12/30 122.8 *Z50
```

***VNN** (optional) – For a specifying magnetic variation for a given site (if your GPS doesn't output it). It overwrites whatever the $GPRMC record says. The relevant part is at the end of the record, after the comment, where you can put: *Vnn (where nn is an integer number, negative for E variation) For example, to specify Easterly variation of 20 deg for a given soaring site, place: *V-20 at the end of one of the records, like this:
`16,39:00.000N,119:45.200W,4718F,ATH,MINDEN ,12/30 122.8 *V-20`

A.3. User Airspace file

```
******* OPEN AIR ™ LANGUAGE *************
•       Version 1.00
•       December 10, 1998
•       Updated October 15, 1999
•       Send comments to jerryp@winpilot.com
*
*
•       AIRSPACE-related record types:
*       ==============================
*
*AC     class   ; where class can be:
R                       restricted
Q                       danger
P                       prohibited
A                       Class A
B                       Class B
C                       Class C
D                       Class D
GP                      glider prohibited
CTR                     CTR
W                       Wave Window
AN string       ;string = Airspace Name
AH string       ;string = Airspace Ceiling
AL string       ;string = Airspace Floor
AT coordinate   ;coordinate = Coordinate of where to place a name label on the map (optional)
NOTE: there can be multiple AT records for a single airspace segment

TERRAIN-related record types (NYI):

TO {string}; Declares Terrain Open Polygon; string = name (optional)
TC      {string); Declares Terrain Closed Polygon; string = name  (optional)
SP style, width, red, green, blue ; Selects Pen to be used in drawing
PEN STYLES in SP command:
             SOLID                              0
             DASH                               1
             NULL (transparent)                 5

Example: for a 1 pixel wide, dashed, light gray pen use: SP 0,1,192,192,192
SB  red, green, blue ; Selects Brush Color to be used in drawing
Example: to select white interior of a closed polygon, use: SB 255, 255, 255
To select transparent interior use: SB -1,-1,-1

Record types common to both TERRAIN and AIRSPACE
V x=n ; Variable assignment.
Currently the following variables are supported:
D={+|-} sets direction for: DA and DB records
```

'-' means counterclockwise direction; '+' is the default; D is automatically reset to '+' at the begining of new airspace segment

X=coordinate : sets the center for the following records: DA, DB, and DC

Z=number ; makes the element invisible at zoom levels > number
T=1 ; transparent Airspace segment (draw border only)
DP coordinate ;add polygon point
DA radius, angleStart angleEnd ; add an arc, angles in degrees, radius in nm
DB coordinate1, coordinate2 ; add an arc, from coordinate1 to coordinate2
DC radius ; draw a circle (center taken from the previous V X record, radius in nm

See www.winpilot.com Airspace Directory for examples.

What's new in the Manual version 5.0

Final Glide Over Terrain

Language (German, French, Italian, and more)

Importing Tasks and Waypoints from SeeYou and StrePla

Setting Serial Port for NavMan, EMTAC, and other Bluetooh GPS sources that plug directly into the Pocket PC device.

The End.